
ENVIRONMENTAL ASSESSMENT

FOR

WEST HAW ECOSYSTEM MANAGEMENT UNIT

COMPARTMENTS 1268, 1269, 1278, 1290

SCOTT COUNTY, ARKANSAS

RESPONSIBLE OFFICIAL: AJ BRIGANCE, DISTRICT RANGER, PO Box 417, BOONEVILLE, AR 72927

APRIL 1, 2016



COMPARTMENT 1268 STAND 2 - PHOTO BY TIMOTHY GILL, SILVICULTURIST – USDA FOREST

FOR FURTHER INFORMATION CONTACT: DONNA S. REAGAN
POTEAU-COLD SPRINGS RANGER DISTRICT, PO Box 417, BOONEVILLE, AR 72927, 479-675-4743 EXT. 107

This project is subject to subparts A and B of 36 *CFR Part 218 Project-Level Predecisional Administrative Review Process* (objection process); it is not authorized under the Healthy Forest Restoration Act (HFRA).

USDA NON-DISCRIMINATION POLICY STATEMENT
DR 4300.003 USDA Equal Opportunity Public Notification Policy (June 2, 2015)

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotope, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at http://www.ascr.usda.gov/complaint_filing_cust.html and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

USDA is an equal opportunity provider, employer, and lender.

TABLE OF CONTENTS

USDA NON-DISCRIMINATION POLICY STATEMENT.....	2
CHAPTER 1 PURPOSE AND NEED.....	5
Proposed Action.....	5
Location.....	5
Management Areas.....	5
Purpose and Need for the Actions.....	5
Scope of this Environmental Analysis.....	9
Public Involvement.....	9
Relevant Planning Documents.....	9
Issues to be Analyzed in Depth.....	10
Decisions to be Made.....	10
CHAPTER 2 PROPOSED ACTION AND ALTERNATIVES (Including Mitigations).....	11
Forest Plan Mitigations.....	11
Technical Requirements.....	11
Project Specific Protective Measures.....	11
Monitoring.....	13
Project Objective Requirements.....	14
Alternatives Considered but Eliminated from Detailed Study.....	14
Alternatives Documented in Detail.....	15
PROPOSED ACTION.....	15
NO ACTION ALTERNATIVE I.....	15
NO HERBICIDE ALTERNATIVE II.....	15
ALTERNATIVE III – NO ROAD CONSTRUCTION.....	16
Other Past, Present, and Reasonably Foreseeable Future Actions.....	16
Summary Comparison of All Alternatives.....	17
Summary Comparison of Environmental Effects by Alternative.....	18
CHAPTER 3 ENVIRONMENTAL DISCLOSURES.....	19
Introduction.....	19
AIR QUALITY.....	20
SOILS.....	23
WATER RESOURCES AND QUALITY.....	26
WILDFIRE HAZARDS AND/OR FUELS.....	30
TRANSPORTATION AND INFRASTRUCTURE.....	31
VEGETATION.....	35
WILDLIFE, HABITAT, AND FISHERIES.....	41
PROPOSED, ENDANGERED, AND THREATENED AND SENSITIVE (PETS) SPECIES.....	52
INSECT AND DISEASE.....	62

ECONOMY	63
PUBLIC HEALTH AND SAFETY	65
RECREATION RESOURCES.....	67
VISUAL RESOURCES	69
HERITAGE RESOURCES.....	71
CLIMATE CHANGE	73
OTHER.....	74
CHAPTER 4 ID TEAM MEMBERS AND PRIMARY AUTHORS*	75
CHAPTER 5 PERSONS AND AGENCIES CONTACTED AND/OR CONSULTED	75
CHAPTER 6 LITERATURE CITED.....	78
APPENDIX A - MAPS	80
APPENDIX B – Desired/Existing Conditions, Needs	88
APPENDIX C – PROPOSED ACTION	91
APPENDIX D – NO ROAD CONSTRUCTION ALTERNATIVE III.....	96

CHAPTER 1 PURPOSE AND NEED

PROPOSED ACTION

The District Ranger on the Poteau-Cold Springs Ranger District, Ouachita National Forest, proposes to implement management activities in the West Haw Ecological Management Unit (Compartments 1268, 1269, 1278, and 1290), henceforth referred to as *West Haw Creek*. Activities proposed include timber harvesting, silvicultural treatments, wildlife treatments, and road system improvements. These activities should begin in 2016, if an action alternative is selected.

West Haw project area consists of 4,149 acres of national forest lands and 988 acres of private land. See the table below.

Summary of existing National Forest lands, private ownership in the *West Haw* analysis area. These are **approximate** acres only based on Geographical Information Systems (GIS).

Land Designation	Total
National Forest Management Areas	
MA 21 (Old Growth Restoration– suitable for timber)	1634
MA 21 (Old Growth Restoration– unsuitable for timber)	280
MA 21 Total Acres in West Haw Creek Project Area	1914
MA 22 (Ouachita Mountains, Habitat Diversity Emphasis– suitable for timber harvest)	1665
MA 22 (Ouachita Mountains, Habitat Diversity Emphasis– unsuitable for timber harvest)	570
MA 22 Total Acres in West Haw Creek Project Area	2235
Total Suitable in both MAs	3299
Total Unsuitable in both MAs	850
Total Acres of National Forest	4149
Private acres within boundary	988
Total Acres within project area (private and NF lands)	5137

LOCATION

West Haw Creek project area is located in Township 2 North, Range 32 West, Sections 19-22, 27-30, 31-32; T1N, R32W, S5-6; T2N, R33W, S24-25, 36; and T1N R33W S1. This project area is in Scott County, Arkansas on the Oklahoma-Arkansas border and is also approximately 4 miles north of the Scott-Polk County lines. Black Fork Wilderness is about 5 miles south of this project area. Walker Mountain lies to the northeast. See Location Map in Appendix A.

MANAGEMENT AREAS

Management actions are needed to move the project area towards the design criteria for Management Area 21 (Old Growth Restoration) and Management Areas 22 (Renewal of the Shortleaf Pine-Bluestem Grass Ecosystem and Red-cockaded Woodpecker Habitat) in the Revised Forest Plan (*USDA Forest Service. 2005a.*). Detailed descriptions of these management areas are located http://www.fs.usda.gov/detail/ouachita/landmanagement/planning/?cid=fsm9_039823 as of 12/28/2015. See Management Areas map in [Appendix A](#).

PURPOSE AND NEED FOR THE ACTIONS

Field examinations and inventories of the *West Haw* project determined that the existing conditions do not meet the desired conditions as mentioned above. The Proposed Actions would move this project towards the desired conditions established by the Interdisciplinary Team and the design criteria in the Revised Forest Plan.

The following pages describe the purpose and need. In addition, please refer to the table in [Appendix B](#) of this document for a detailed table of existing conditions, desired conditions, site specific needs, and possible management activities.

Need to Renew the Shortleaf Pine-Bluestem Grass Ecosystem and Red-cockaded Woodpecker (RCW) Habitat in Management Area 22

There is a need to maximize optimum habitat for the endangered RCW and encourage expansion. The dominant natural plant community of this area should be shortleaf pine trees with bluestem grasses and a variety of other herbaceous plants flourishing on the forest floor. Hardwood dominated areas should be less numerous in this management area than in others across the Forest, but should still comprise at least 20 percent of the area. Hardwood trees should be more common in stream corridors and on some north-facing slopes.

The overall design for the Ouachita Mountains RCW Habitat Management Area (HMA) in Arkansas (of which this project area is a part of) is designed to support a future population of at least 250 RCW breeding groups, as defined by the USFWS Recovery plan for a Secondary Core Population. This HMA has sufficient habitat capacity to provide for 400 active clusters; the smaller Oklahoma HMA has sufficient habitat capacity to provide for 50 active clusters. Active management of these HMAs should yield an approximate 5 percent annual population increase.

There is a need for a large portion of the area to feature a fairly open canopy varying from approximately 60-80 square feet of basal area per acre of older pine and hardwood trees. The 0-10 year age class should make up no more than 8.3 percent of the area and should have at least 66 percent of the acreage in trees older than 40 years, including 40 percent of the acreage in trees older than 70 years, and approximately 17 percent of the acreage in trees older than 100 years.

The forest floor should contain a high number of herbaceous plant species, reptiles, small mammals, and breeding birds. There needs to be large blocks of older trees. Ecotonal differences should be minimized by limiting age differences between stands.

The following is proposed to improve Management Area 22 ecological system:

- Remove non-native species, such as loblolly pine
- Retain no more than 10 square feet of basal area per acre in overstory hardwoods. Remove all hardwoods within 50 feet of cavity trees in active, inactive, and recruitment clusters
- RCW enhancement treatments such as RCW cavity restrictors, snake and squirrel excluder devices, artificial cavities, single-bird augmentations, multiple-bird group-initiations, removal of southern flying squirrels, population/nest monitoring, brush hogging around cavity trees, cavity maintenance
- Southern pine beetle (SPB) and Ips beetle control efforts
- Prescribed Burning
- Regeneration harvests
- Thinning
- Midstory Removal

Need to Restore Old Growth in Management Area 21

Pine-grass old growth forests, woodlands and other old growth conditions need restored and perpetuated. Inclusions of existing hardwood stands need to be managed for old growth characteristics. Pine stands are generally not densely stocked (total basal area 50-80 square feet) and include many trees over 100 years old. Many trees are large (>20" dbh) and have a "flat topped" appearance. Old growth pine-grass forests and woodlands are characterized by relatively open conditions and a grassy understory. MA 21 may include pine in almost pure stands, pine mixed with oak and sometimes hickory, or even patches of relatively pure stands of post oak and blackjack oak. These forests and woodlands are characterized by open stands of old, large, and often widely spaced pines and oaks, occurring in patches and clumps. The forest floor supports a rich mix of grasses, forbs, wildflowers, and low shrubs.

Redheart disease, downed woody debris, and snags are common. Access is from low-standard roads, many of which are closed seasonally or year-round. Pine-grass old growth provides habitat for a wide range of wildlife. Deer and other early seral stage species are favored by the abundant grassy understory, while woodpeckers and other species associated with mature forests are supported by the mature-tree component. Species requiring cavities and snags (e.g., raptors, bluebirds, woodpeckers) are favored over those highly dependent on hard mast (e.g., squirrels) or dense brush (e.g., gray fox).

The following is proposed to improve Management Area 22 ecological system:

- Irregular seed tree or irregular shelterwood reproduction cutting methods (some of the seed trees are retained indefinitely)
- Periodic prescribed burning
- Retain no more than 10 square feet of basal area per acre in overstory hardwoods. Remove all hardwoods within 50 feet of cavity trees in active, inactive, and recruitment clusters

Need to Ensure Regeneration Stands are Restocked

There is a need to ensure that regeneration stands are stocked with a minimum of 150 seedlings per acre within 5 years after harvest. Treatments are necessary to enable young seedlings that have been naturally established or hand planted seedlings to compete for growing space. The objective would be to control existing hardwood vegetation that is competing to occupy the regeneration stands because the older hardwoods have well established root systems and quickly “overtop” small pine seedlings. The shading effect quickly kills young pine regeneration. There is a need to increase the growth and improve the quality and vigor of trees with the stand.

The following is proposed on regeneration stands (existing and new) to ensure stand restocking:

- Site preparation
- Release
- Timber stand improvements
- Mechanical scarification
- Rip and planting
- Option to use herbicides to ensure restocking on new regeneration stands
- Prescribed Burning

Need to Improve Wildlife Habitat

There is a need to improve wildlife habitat by producing a grass/forb understory and enhancing hard mast production by residual hardwood crowns.

There is a need to create early seral stage habitat, because there is less than 10 acres in the 0-10 year age class in *West Haw* (USDA Forest Service. 2005a, Pg. 7, 35, and Objective OBJ06, Pg.59). Management Area 21 objective is to have at least 3% and not more than 6% of the suitable stands in the 0-10 age class. Management Area 22 objective is to have at least 4% and not more than 8.3% suitable stands in the 0-10 age class. To meet MA 21 objective, at least 49 acres and not more than 98 acres would need to have a regeneration harvest to create this age class in the suitable lands. To meet this MA 22 objective, at least 67 acres and not more than 138 acres would need to have a regeneration harvest to create this age class in the suitable lands.

There is a need to create and maintain any temporary wildlife openings for early seral stage. Temporary wildlife openings are created from log landings, firelines and temporary roads (Revised Forest Plan. Design Criteria Pg. 78). Existing openings could be maintained by prescribed burning, disking, seeding, planting, fertilizing, brush hogging, and/or bull dozing.

Water sources are needed to maintain adequate water supply according to the (Revised Forest Plan. Design Criteria WF010, Pg. 79). The Forest Plan suggests one water source for every 160 acres. *West Haw Creek* does not need any additional water sources to meet these objectives but reconstruction of woodland ponds is needed because dams have encroaching woody vegetation, which can result in water retention problems. This action would ensure that wildlife has sufficient water available on a year-round basis.

Nest structures are needed in a variety of habitats for a variety of species. Many snags and cavity trees were created in this area by the December 2000 ice storm and again in January 2014. This was a positive condition for many cavity dependent species. However, time is now causing a loss of these snags and cavity trees.

There is a need to manage invasive and non-native species to stop or slow the infestation that competes with native species such as shortleaf pine.

Open road density needs to be lowered, where possible, for the purpose of reducing disturbance to wildlife during the reproductive season. Currently, open road density is 1.5 miles per square mile, exceeding the Revised Forest Plan's objective of striving for at maximum of 0.75-1.0 miles per square mile.

The following is proposed to improve wildlife habitat:

- Retain 10-20% of quality hardwood, where available. Wildlife stand improvements by midstory reduction using hand tools or mechanical equipment depending on terrain, species composition, and cost
- Regeneration Harvests
- Wildlife stand improvements by midstory reduction using hand tools or mechanical equipment depending on terrain, species composition, and cost
- Reconstruct woodland ponds
- Install wood duck boxes, squirrel boxes and bluebird boxes, where appropriate
- Herbicide treatment (invasive and non-native species)
- Prescribed Burning
- Fireline construction and reconstruction
- Temporary Roads - Per Revised Forest Plan design criteria, temporary roads will be decommissioned, revegetated, and recontoured upon termination of management activity.
- Road Reconstruction
- Road Obliteration
- Close Roads, where feasible
- Replace culverts, where necessary

Need to Improve Access and Provide Safe Access to Project Area

There is a need to improve the current road system within the project area for access and safety purposes. The roads have surface and ditch erosion as well as rusted out drains. Only temporary access is needed in some areas for project work. There is a need to take some roads off the system because the roads are no longer needed and cross streams at undesirable locations. (Revised Forest Plan. Design Criteria TR001, Pg. 90).

The following is proposed to improve the road system in the project area:

- Construct roads needed for access to project area
- Reconstruct existing roads
- Close any new roads after project work is completed
- Utilize pre-haul maintenance
- Obliterate roads, if needed
- Construct temporary roads - Per Revised Forest Plan design criteria, temporary roads will be decommissioned, revegetated, and recontoured upon termination of management activity.
- Replace culverts

Need to Reduce Fuel Loading on Forest Floor

There is a need to reduce the fuels that have accumulated on the forest floor from damaged and dying timber. Fuel loading can lead to hotter fires (unmanaged and unplanned) that would damage resources, threaten personal property, and create fire intensity that is unsafe for fire fighters. Managing fuel loading on forest floors is safer and more beneficial for the environment.

The following is proposed to reduce fuel buildup:

- Prescribed Burning (managed and planned)

Need to be Good Neighbors

There is a need in the community to offer firewood and rock permits periodically from private citizens upon requests. Project work can create areas of collection. (Revised Forest Plan. Design Criteria FW001, Pg. 97). In addition, there is a need to properly mark boundary lines and property corners.

The following is proposed to be good neighbors:

- Issue firewood permits in areas designated when requested (usually site prep and wildlife stand improvement areas)
- Issue rock permits, when requested, within areas of disturbance associated with road construction and reconstruction corridors
- Blaze and repaint line trees on boundary lines and property corners.

SCOPE OF THIS ENVIRONMENTAL ANALYSIS

The team's ecosystem analysis is incorporated by reference and included in the project file. The scope of this decision does not include other actions that would be planned in the compartments in the unforeseeable future. All of the actions associated with this analysis are foreseeable, and would be included in the analysis of effects since they may contribute to direct, indirect or cumulative effects on the environment.

PUBLIC INVOLVEMENT

Public involvement began September 30, 2015. An email was sent with an electronic link to the detailed description of the Proposed Actions and associated maps using PALS's electronic mailing list. This list is created from those whom have shown interest in this project through the project website <http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=47489>. In addition, a hardcopy was mailed and a direct email was sent to individuals informing them of the electronic link to the project information. A list of recipients is located in the project file at the district office. As a result, Lindsey D. Bilyeu, NHPA Senior Section 106 Reviewer-Historic Preservation Department) with the Choctaw Nation of Oklahoma and John Fox with Osage Nation responded. Both comments were requesting if a cultural survey has been conducted. Archeologist Lexie Rue-Harris responded to both by email. Responses are on file at the district office.

RELEVANT PLANNING DOCUMENTS

The following documents directly helped develop the Proposed Action by setting the "side boards" to reach desired future conditions:

- Revised Land and Resource Management Plan, Ouachita National Forest, Arkansas and Oklahoma, 2005 (USDA Forest Service, 2005a).
- Final Environmental Impact Statement (FEIS), Revised Land and Resource Management Plan, Ouachita National Forest, Arkansas and Oklahoma, 2005 (USDA Forest Service, 2005b).
- Programmatic Biological Opinion of the Revised Land and Resource Management Plan on the American Burying beetle (USDI FWS September 2005).
- Biological Evaluation of Environmental Assessment in *West Haw Creek* (February, 2016).
- Travel Analysis Process – *West Haw Creek* (June 2015).
- Human Health and Ecological Risk Assessment Final Reports for glyphosate, triclopyr, and Imazapyr herbicides, March 25, 2011; May 24, 2011 and December 16, 2011. Syracuse Environmental Research Associates, Inc.
- Biological Assessment for the Revised Land and Resource Management Plan.

ISSUES TO BE ANALYZED IN DEPTH

Issues drive the formulation of alternatives. Issues may develop because of the extent of their geographic distribution, the duration of their effects, or the intensity of interest or resource conflict. The Proposed Action was designed to meet the design criteria *documented* in “The Purpose and Need for Actions” section of Chapter 1.

Issue #1: *Herbicide use is considered an “issue to be analyzed in depth” because of the intensity of interest that will require the formulation of a “non-herbicide” alternative. Herbicides are proposed to achieve the desired conditions to establish native forest cover where needed. This would be to remove nonnative species such as mimosa or privet.*

Issue #2: *Road construction is considered an “issue to be analyzed in depth” because of the intensity of interest that will require the formulation of a “no road construction” alternative. Road construction is proposed to access forest stands proposed for harvest.*

DECISIONS TO BE MADE

The deciding officer, District Ranger for the Poteau/Cold Springs Ranger District, Ouachita National Forest, must make two decisions: decide which alternative or the Proposed Action to implement, and decide if those actions would constitute a major federal action and result in significant impacts on the human environment (FONSI or Finding of No Significant Impact.).

CHAPTER 2 PROPOSED ACTION AND ALTERNATIVES (INCLUDING MITIGATIONS)

FOREST PLAN MITIGATIONS

The Forest-wide Design Criteria for Management Areas 21 and 22 are incorporated by reference as mitigating measures into the Proposed Action by smart design and are located on the website (as of 04/14/15) at http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsm9_039613.pdf.

TECHNICAL REQUIREMENTS

The FEIS was prepared to analyze and select the preferred mix and projected levels of vegetation management methods and tools needed to achieve the goals and objectives identified in the Revised Forest Plan. The FEIS identifies management requirements and mitigation measures (USDA FS, 2005b, Chapter 3 – pg. 23 – 283) to be applied to all methods of vegetation management. The proposed actions would adhere to all applicable management requirements and mitigation measures in the FEIS, which are incorporated in this document by reference. The alternative proposing herbicide use has been analyzed additionally by utilizing the Human Health and Ecological Risk Assessment process developed by the Syracuse Environmental Research Associates.

PROJECT SPECIFIC PROTECTIVE MEASURES

Soils

Allow heavy equipment operations on hydric soils, soils with a severe compaction hazard rating, and floodplains with frequent or occasional flooding hazard only during the months of July through November. Operations during December through June are allowed with the use of methods or equipment that do not cause excessive soil compaction. This standard does not apply to areas dedicated to intensive use, including but not restricted to administrative sites, roads, primary skid trails, log decks, campgrounds, and special use areas. (Revised Forest Plan, SW001, p. 74)

Allow heavy equipment operations on soils that have a high compaction hazard rating during the months of April through November. Operations during December through March are allowed for soil units with a moderate-high compaction hazard rating. Off-trail log (1 to 3-pass) retrieval by heavy equipment is acceptable during dry soil conditions. Dry soil condition is defined as when the soil moisture does not exceed its plastic limit in the surface 8 inches and when the water table (if present) is deeper than 12 inches from the surface on plastic soils. Soil moisture exceeds the plastic limit if the soil can be rolled out to a pencil-sized string without breaking or crumbling. This standard does not apply to areas dedicated to intensive use, including but not restricted to administrative sites, roads, primary skid trails, log decks, campgrounds, and special use areas. (Revised Forest Plan, SW002, p. 74)

These standards apply to operations in the stands displayed in the table below.

Stands Requiring a Limited Operating Season (Moderate-High Compaction Hazard Rating)

COMPARTMENT	STAND	OPERATING SEASON
1269	12	April-November
1269	22	April-November
1269	23	April-November
1278	1	April-November
1278	4	April-November
1278	27	April-November
1290	5	April-November
1290	9	April-November

Erosion: No areas of active soil erosion were found during field examinations. All ground disturbing activities will be treated while complying with Best Management Practices (BMPs) as established by agency policy and guidelines. A soil map is located in the Soils section of this document.

Herbicide Use

- HU001 – Herbicides will be used only where necessary to achieve the desired condition in the treatment area, and then only when site specific analysis shows no unacceptable negative effects to human or wildlife health or the ecosystem as defined in HU002.
- HU002 – Herbicides will be applied at the lowest rate effective in meeting project objectives and according to guidelines for protecting human and wildlife health. Site-specific risk assessments are required prior to herbicide application and must be calculated using the procedure developed by Syracuse Environmental Research Associates (SERA).
- HU003 – To minimize potential effects of herbicide use, whenever possible, use individual stem treatments and directed spraying.
- HU004 – Herbicides that are not soil-active will be used in preference to soil-active ones when the vegetation management objectives can be met.
- HU006 – Clearly marked buffers will protect streamside zones, private land and public water supplies.
- HU010 – The use of herbicides is prohibited in the immediate vicinity of Proposed, Endangered, or Threatened plants.
- HU011 – Within a 300-foot buffer from any source waters (public water supply), do not apply herbicide treatments unless a site-specific analysis supports use within the designated buffer to prevent more serious environmental damage than is predicted if pesticides are used.
- HU012 – No herbicide mixing, loading, or cleaning areas will occur within a 300-foot buffer of private land, open water, source waters (public water supply), wells, or other sensitive areas.
- HU018 – A certified pesticide applicator will administer all pesticide application contracts and will supervise any Forest Service personnel involved with the application of pesticides on the Forest.

Heritage

The following measures only apply to cultural resource sites that are unevaluated, eligible for listing, or listed in the National Register of Historic Places.

HP1: Site Avoidance During Project Implementation

Avoidance of historic properties (HP) will require the protection from effects resulting from the undertaking. Effects will be avoided by (1) establishing clearly defined site boundaries and buffers around archeological sites where activities that might result in an adverse effect. Buffers will be of sufficient size to ensure that integrity of the characteristics and values which contribute to, or potentially contribute to, the properties' significance will not be affected, and (2) routing proposed new roads, temporary roads, log landings and skid trails away from historic properties;

HP2: Site Protection During Prescribed Burns

- *Firelines.* Historic properties located along existing non-maintained woods roads used as fire lines will be protected by hand-clearing those sections that cross the sites. Although these roads are generally cleared of combustible debris using a small dozer, those sections crossing archeological sites will be cleared using leaf blowers and/or leaf rakes. There will be neither removal of soil, nor disturbance below the ground surface, during fireline preparation. Historic properties and features located along proposed routes of mechanically-constructed firelines, where firelines do not now exist, will be avoided by routing fireline construction around historic properties. Sites that lie along previously constructed dozer lines from past burns where the firelines will be used again as firelines, will be protected during future burns by hand clearing sections of line that cross the site, rather than re-clearing using heavy equipment. Where these activities will take place outside stands not already surveyed, cultural resources surveys and regulatory consultation will be completed prior to project implementation. Protection measures, HP1, HP3, and HP4, will be applied prior to project implementation to protect historic properties.
- *Burn Unit Interior.* Combustible elements at historic properties in burn unit interiors will be protected from damage during burns by removing excessive fuels from the feature vicinity and, as necessary, by burning out around the feature prior to igniting the main burn, creating a fuel-free zone. Burn out is accomplished by constructing a set of

two hand lines around the feature, approximately 30 to 50 feet. apart, and then burning the area between the two lines while the burn is carefully monitored. Combustible features located in a burn unit will also be documented with digital photographs and/or field drawings prior to the burn. Historic properties containing above ground, non-combustible cultural features and exposed artifacts will be protected by removing fuel concentrations dense enough to significantly alter the characteristics of those cultural resources. No additional measures are proposed for any sites in the burn interior that have been previously burned or that do not contain combustible elements or other above ground features and exposed artifacts as proposed prescribed burns will not be sufficiently intense to cause adverse effects to these features.

- *Post-Burn Monitoring.* Post-burn monitoring may be conducted at selected sites to assess actual and indirect effects of the burns on the sites against the expected effects. SHPO consultation will be carried out with respect to necessary mitigation for any sites that suffer unexpected damage during the burn or from indirect effects following the burn.

HP3: Other Protection Measures

If it is not feasible or desirable to avoid an historic property that may be harmed by a project activity (HP1), then the following steps will be taken: (1) In consultation with the Arkansas SHPO, the site(s) will be evaluated against NRHP significance criteria (36 CFR 60.4) to determine eligibility for the NRHP. The evaluation may require subsurface site testing; (2) In consultation with the Arkansas SHPO, tribes and nations, and with the ACHP if required, mitigation measures will be developed to minimize the adverse effects on the site, so that a finding of No Adverse Effect results; (3) The agreed-upon mitigation measures will be implemented prior to initiation of activities having the potential to affect the site.

HP4: Discovery of Cultural Resources during Project Implementation

Although cultural resources surveys were designed to locate all NRHP eligible archeological sites and components, these may go undetected for a variety of reasons. Should unrecorded cultural resources be discovered, activities that may be affecting that resource will halt immediately; the resource will be evaluated by an archaeologist, and consultation will be initiated with the SHPO, tribes and nations, and the ACHP, to determine appropriate actions for protecting the resource and mitigating adverse effects. Project activities at that locale will not resume until the resource is adequately protected and until agreed-upon mitigation measures are implemented with SHPO approval.

MONITORING

The Revised Forest Plan lists monitoring activities for the Ouachita National Forest. The Forest's monitoring program is designed to evaluate the environmental effects of actions similar to those proposed in this project, and also serves to assess the effectiveness of treatments. In order to ensure that the appropriate design criteria protecting soil stability, water quality, and other resources are followed, trained contract administrators and inspectors would be on-site during the implementation phase of the project. For those activities that include the use of herbicides, surveillance monitoring to ensure that herbicide label instructions are being followed would be conducted as part of the contract administration. Form R8-FS-2100-1, Herbicide Treatment and Evaluation Record, would be used to monitor work involving herbicides. Stream samples would also be taken to monitor for offsite movement. West Haw Creek would be monitored before and after the Proposed Actions including timber harvesting, reforestation, and wildlife activities. Stream monitoring surveys would be required in this medium Watershed Condition Rank (WCR) watershed.

PROJECT OBJECTIVE REQUIREMENTS

- NEED TO RENEW THE SHORTLEAF PINE-BLUESTEM GRASS ECOSYSTEM AND RCW HABITAT IN MANAGEMENT IN MA 22
 - ❖ To create a healthy forest condition using MA 22 guidelines
- NEED TO RESTORE OLD GROWTH IN MANAGEMENT AREA 21
 - ❖ To create a healthy forest condition using MA 21 guidelines
- TO ENSURE REGENERATION STANDS ARE RESTOCKED
 - ❖ To site prep a bed for seed fall after the regeneration harvests
 - ❖ To create a suitable seedbed in regeneration sites after initial prescribed burning
 - ❖ To ensure survival of desired trees by releasing suppressed trees from competing tree species
- TO IMPROVE WILDLIFE HABITAT
 - ❖ To create early seral stage habitat
 - ❖ To provide new growth for wildlife to eat
 - ❖ To create water sources for wildlife.
 - ❖ To reduce midstory and allow development of grasses and forbs on the forest floor
 - ❖ To move toward the open road density objective
 - ❖ To stop or slow the infestation of invasive and non-native species
 - ❖ To improve fish passage
- TO IMPROVE ACCESS TO PROJECT AREA AND PROVIDE SAFE ROAD SYSTEM.
 - ❖ To repair or maintain road surfaces, ditch erosion, and repair or replace rusted-out pipes
 - ❖ To provide short-term access to harvest units
 - ❖ To reduce the impacts to streams and get rid of roads not needed in the future
- TO REDUCE FUEL LOADING.
 - ❖ To prevent natural resources from being damaged
 - ❖ To protect personal property from wildfires
 - ❖ To reduce wildfire intensity to provide a safer environment for fire fighters

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

There were no unresolved conflicts to drive additional alternatives, but the interdisciplinary team considered the following:

No Harvest Alternative

This alternative was considered by the Interdisciplinary Team but eliminated from detailed analysis because the Team felt the No Action Alternative adequately addressed the overall effects of a no harvest alternative.

ALTERNATIVES DOCUMENTED IN DETAIL

PROPOSED ACTION

Summary of Proposed Activities - These are approximate acres only based on field examinations, GIS, and GPS.

PROPOSED MANAGEMENT ACTIVITIES	1268	1269	1278	1290	Total
TIMBER HARVESTS					
Commercial Thinning 60 BA pine	479	951	101	536	2067
Commercial Thinning 60 BA pine 10 hardwood	81	132	0	12	225
Commercial Thinning on 20' spacing (pole stands)	139	307	0	149	595
Subtotal of Commercial Thinning Harvests	699	1390	101	697	2887
Clearcut Loblolly with Regen; Replant with Shortleaf Pine	0	0	57	0	57
Modified Shelterwood (Regeneration stands)	49	80	0	25	154
Subtotal of Regeneration Harvests	49	80	57	25	211
TOTAL HARVEST	748	1470	158	722	3098
SILVICULTURE					
Prescribed Burning (3-5 year rotation)	1095	1924	188	942	4149
Reforestation and TSI of proposed regeneration stands ***	49	80	57	25	211
TSI (hand tool release/pre-comm. thinning) of previous regen stands	0	0	0	37	37
WILDLIFE					
WSI on Commercially Thinned stands proposed to 60 BA	560	1083	101	548	2292
Ponds Reconstruction	11	16	1	5	33
ROADS					
Roads: Obliteration					9.95
Roads: Reconstruction					2.0
Roads: Construction					1.0
Roads: Pre Haul Maintenance					9.05
Roads: Temporary					14.0
Other					
Landline Maintenance (miles)					7.5
Fireline Construction (miles)					2.81
Fireline Reconstruction (miles)					16.4
NNIS treatment with herbicide as needed					Yes

Refer to **Appendix C** for a detailed description of the Proposed Action.

NO ACTION ALTERNATIVE I

Under the No Action Alternative neither the Proposed Action nor any action alternative would be implemented. Management activities would be deferred until a later entry. However, ongoing Forest Service approved activities would continue in the project area, such as the following but not limited to fire suppression, hunting, public vehicle access, road maintenance, dispersed camping, and salvage actions. **Fire suppression:** Human and natural caused fires would be suppressed.

NO HERBICIDE ALTERNATIVE II

This alternative is exactly the same as the Proposed Action EXCEPT the use of herbicide for treatment is **not** proposed.

ALTERNATIVE III – NO ROAD CONSTRUCTION

Under this alternative, there would be no road construction (temporary or system); only proposed timber harvest (and dependent management actions) accessible by the current transportation system would occur.

Summary of Proposed Activities - These are approximate acres only based on field examinations, GIS, and GPS.

ALTERNATIVE III MANAGEMENT ACTIVITIES	1268	1269	1278	1290	Total
TIMBER HARVESTS					
Commercial Thinning 60 BA pine	116	298	101	142	657
Commercial Thinning 60 BA pine 10 hardwood	81	0	0	0	81
Commercial Thinning on 20' spacing (pole stands)	71	66	0	0	137
Subtotal of Commercial Thinning Harvests	268	364	101	142	875
Clearcut Loblolly with Regen; Replant with Shortleaf Pine	0	0	57	0	57
Modified Shelterwood (Regeneration stands)	49	0	0	25	74
Subtotal of Regeneration Harvests	49	0	57	25	131
TOTAL HARVEST	317	364	158	167	1006
SILVICULTURE					
Prescribed Burning (3-5 year rotation)	1095	1924	188	942	4149
Reforestation and TSI of proposed regeneration stands ***	49	0	57	25	131
TSI (hand tool release/pre-comm. thinning) of previous regen stands	0	0	0	37	37
WILDLIFE					
WSI on Commercially Thinned stands proposed to 60 BA	197	298	101	142	738
Ponds Reconstruction	R-11	R-12	R-1	R-2	26
ROADS					
Roads: Obliteration					9.95
Roads: Reconstruction					2.0
Roads: Pre Haul Maintenance					7.59
Other					
Landline Maintenance (miles)					7.5
Fireline Construction (miles)					2.81
Fireline Reconstruction (miles)					14.87
NNIS treatment with herbicide as needed					Yes

Refer to **Appendix D** for a detailed description of Alternative III.

OTHER PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

This area has a history of prescribed burning to create and retain RCW habitat in the Pine/bluestem management area. The project area was part of an area hit by the southern pine beetle epidemic of 1995. There is a reasonable expectation that an epidemic could occur again. Recent trapping results for southern pine beetles (SPB) are at normal levels, but the SPB populations in Mississippi are at epidemic levels and moving toward southeast Arkansas according to Jim Smith, regional entomologist (email, June 2012). Oak decline is occurring in scattered pockets throughout the project area. There are still falling dead and dying trees in the project area as a result of past weather events, the most recent occurring from an ice storm in January 2014. Salvage sales were conducted within these compartments to remove some dead or dying pine trees. Private land is mostly pastureland or grazed woodlands. There is very little commercial timber. There are no other known past, present, and reasonably foreseeable future activities other than what is identified here and in the water quality section and what is proposed in this environmental assessment other than prescribed burning adjacent to project area.

SUMMARY COMPARISON OF ALL ALTERNATIVES

Comparison of Primary Objectives by Alternative (approximates only)

Primary Objectives	Proposed Activities	Units of Measure	Proposed Action	Alternative I No Action	Alternative II No Herbicide	Alternative III No Road Construction
To create a healthy forest condition.	Timber Harvest	Acres	3,098	0	3,098	1,006
To create early seral stage habitat (even-age only).	Modified Shelterwood, Clearcut	Acres	211	0	211	131
To remove off-site species (loblolly)	Clearcut	Acres	57	0	57	57
To reduce competing vegetation for nutrients, water, and sun.	Commercial Thinning	Acres	2,887	0	2,887	875
To site prep a bed for seed fall after the regeneration harvests. To provide new growth for wildlife to eat. To reduce heavily stocked understories and midstories primarily due to lack of fire as part of the ecosystem. To reduce fuel loading.	Prescribed Burning	Acres	4,149	0	4,149	4,149
To create a suitable seedbed in regeneration sites after initial prescribed burning	Site Prep	Acres	211	0	211	131
To increase growth rate and quality of desired trees by reducing competition for nutrients and water among species	Pre-commercial thinning/TSI	Acres	248	0	248	168
To insure survival of desired trees by releasing suppressed trees from competing tree species.	Hand Tool Release	Acres	211	0	211	131
To create water sources for wildlife.	Pond Rehabilitation	# Ponds	33	0	33	26
To reduce midstory and allow development of grasses and forbs on the forest floor.	Wildlife Stand Improvements	Acres	2,292	0	2,292	738
To move toward the open road density objective.	Road Closures	1 mi/sq/mi	1.03	1.50	1.03	1.03
To access harvest units and provide safe road system.	Road Construction	Miles	1.00	0.00	1.00	0.00
To repair or replace rusted-out pipes and road surface and ditch erosion.	Road Reconstruction Prehaul Maintenance	Miles	2.0 9.05	0	2.0 9.05	2.0 7.59
To provide short-term access to harvest units.	Temporary Roads	Miles	14.0	0	14.0	0.00
To reduce the impacts to streams and get rid of roads that are not needed in the future	Road Obliteration	Miles	9.95	0	9.95	9.95
To supply firewood areas to the local community.	Firewood Permits	Yes/No	Yes	No	Yes	Yes
To supply rock permits to the local community.	Rock Permits	Yes/No	Yes	No	Yes	Yes
To control non-native invasive species	Herbicides	Yes/No	Yes	No	No	Yes
To maintain landlines	Paint/Blaze	Miles	7.5	0	7.5	Yes

SUMMARY COMPARISON OF ENVIRONMENTAL EFFECTS BY ALTERNATIVE

Environmental Effect (measure)	Measure	Proposed Action with Herbicide Use	Alternative I No Action	Alternative II Proposed Action with No Herbicide	Alternative III No Road Construction
Watershed Condition Rank 111101050203	Net increase	Moderate	Low	Moderate	Moderate
Early Seral Habitat Created (modified shelterwood & clearcut)	4%- 8.3% MA 22	74 ac. (shelterwood) + 57 ac. (clearcut) + 0 ac. (existing) = 131 acres (7.7 %)	0 ac (existing regen) 0%	74 ac. (shelterwood) + 57 ac. (clearcut) + 0 ac. (existing) = 131 acres (7.7 %)	74 ac. (shelterwood) + 57 ac. (clearcut) + 0 ac. (existing) = 131 acres (7.7 %)
	3%- 6% MA 21	80 ac. (shelterwood) + 0 ac. (clearcut) + 0 ac. (existing) = 80 acres (5 %)		80 ac. (shelterwood) + 0 ac. (clearcut) + 0 ac. (existing) = 80 acres (5 %)	0 ac. (shelterwood) + 0 ac. (clearcut) + 0 ac. (existing) = 0 acres (0%)
Volume Harvested	(ccf)	20,000	0	20,000	7,780
Air Quality meets National Ambient Air Quality Standards	Below concentration limits for atmospheric pollutants	Yes	Yes	Yes	Yes
Impacts to Wildlife	(Habitat Capability Meets Minimum Viable Populations for all MIS Species - Baseline (Yes/No))	Yes	No	Yes	Yes
Resulting Road Density	(miles per square mile—goal is 1.0 mile per square mile)	1.03	1.50	1.03	1.03
Impacts on Society and Economy	(Special Use permits provided - Yes/No)	Yes	No	Yes	Yes
Hardwood/Pine and Hardwood in watershed	(acres/%)	Pine 3,548 acres 85.5% Hardwood 601 ac. 14.5%	same	same	same
Revenue Cost Ratio	<1.0 below cost - >1.0 is above cost	1.51	NA	1.51	1.08

Issues Comparison

Issue	Measure	Proposed Action	Alternative I No Action	Alternative II No Herbicide	Alternative III No Road Construction
Herbicide Use option (if needed only)	Yes/No	Yes	No	Yes	No
Road Construction	Miles	1.00 System 14.00 Temporary	0	1.00 System 14.00 Temporary	0

CHAPTER 3 ENVIRONMENTAL DISCLOSURES

INTRODUCTION

The actions described by the Proposed Action are typical of those projected for implementation in the Revised Land and Resource Management Plan and for which the environmental effects are disclosed in the Final Environmental Impact Statement (FEIS). This environmental assessment tiers to the FEIS.

The following inventories and sources of information were used in the analysis:

- Silvicultural field examinations for *West Haw Creek* were conducted in 2013. Information collected in this inventory is maintained in Forest Service Vegetation database (FSVEG). A summary of this information is located in the project file at the district office and is incorporated by reference.
- District compartment records of previous management activities.
- Soils Resource Reports prepared by Forest Soil Scientist Jeff Olson, December 2015
- SMS –Scenery Management System by Ouachita National Forest Recreation Staff.
- Heritage resource surveys by Certified Heritage Resource Technicians and District Archeologist
- Sensitive, threatened or endangered species database from the Arkansas Natural Heritage Commission.
- Sensitive plant survey by Vernon Bates, Botanist under contract to the ONF and Arkansas Nature Conservancy.
- Regional Forester's Sensitive Species List.
- U.S. Fish and Wildlife Service list of Endangered Species.
- American burying beetle (ABB) surveys
- Field examination for the Biological Evaluation by the District Wildlife Biologist.
- Geographic Information System (GIS) data files.
- Travel Analysis Process – *West Haw Creek* (September 2015).
- No stream surveys were conducted because this watershed remains at a LOW risk according to the ACE model.

AIR QUALITY

Present Conditions

Air pollution is the presence in the atmosphere of one or more contaminants of a nature, concentration, and duration to be hazardous to human health or welfare (Sandberg and others 1999). Air quality is a measure of the presence of air pollution. Ambient air quality is defined by the Clean Air Act as the air quality anywhere people have access, outside of industrial site boundaries. National ambient air quality standards (NAAQS) are standards of air quality designed to protect human health or welfare and are applied to six criteria pollutants. Although the proposed project includes several different activities, not all proposed activities result in air emissions. Thus, this air analysis will only focus on the one proposed activity, prescribed burning, that results in an increase in air emissions.

Emissions from wildland fire include carbon dioxide, water, carbon monoxide, particulate matter, hydrocarbons or volatile organic compounds, and nitrogen oxides. Carbon monoxide is the most abundant pollutant emitted from wildland fire. It is of concern to human health, because it binds to hemoglobin in place of oxygen and leads to oxygen deprivation and all of the associated symptoms, from diminished work capacity to nausea, headaches, and loss of mental acuity. Carbon monoxide concentrations can be quite high adjacent to the burn unit, but they decrease rapidly away from the burn unit toward cleaner air. Carbon monoxide exposure can be significant for those working the line on a prescribed fire, but due to rapid dilution, carbon monoxide is not a concern to urban and rural areas even a short distance downwind. Nitrogen oxide emissions from wildland fires are very small, and hydrocarbon emissions are moderate. Alone they are not very important to human health, but they are precursors to the criteria pollutant, ozone. Ozone is formed in the atmosphere when nitrogen oxides and hydrocarbons combine in the presence of sunlight. Fire-related NO_x and hydrocarbon emissions become more important to ozone levels only when other persistent and much larger pollution sources already present a substantial base load of precursors. The most important pollutant from wildland fire emissions is fine particulate matter (PM_{2.5}) due to the amount emitted and the effects on human health and visibility (Hardy et al. 2001). The term fine particulate refers to particulate matter 2.5 microns or less in diameter.

Under the Clean Air Act, the Environmental Protection Agency (EPA) establishes air quality standards to protect public health, including the health of "sensitive" populations such as people with asthma, children, and older adults. EPA also sets limits to protect public welfare. This includes protecting ecosystems, including plants and animals, from harm, as well as protecting against decreased visibility and damage to crops, vegetation, and buildings. EPA has set national air quality standards for six common air pollutants (also called the criteria pollutants):

- ozone (O₃),
- particulate matter (PM),
- carbon monoxide (CO),
- nitrogen dioxide (NO₂),
- sulfur dioxide (SO₂), and
- lead (Pb)

If the air quality in a geographic area meets or is cleaner than the national standard, it is called an attainment area; areas that don't meet the national standard are called nonattainment areas. If an area is designated as nonattainment, it signifies that the air in the area is unhealthy to breathe.

The criteria pollutants of most concern on the Ouachita National Forest are particulate matter and ozone. Fine particulate matter is the leading cause of regional haze (also known as visibility impairment), while ozone can harm sensitive vegetation within the forest. Additionally, at elevated concentrations these two pollutants can impair the health of both employees of and visitors to the National Forest. Arkansas and Oklahoma state air regulators monitor ozone and fine particulate matter at several locations near the proposed project. Specifically, ozone monitoring is conducted in Polk County in Arkansas, and in McCurtain County, Oklahoma. Fine particulate matter monitoring is conducted in Polk County, Arkansas. None of these monitors have measured values greater than the air quality standards (NAAQS) set by EPA. Additionally, it should be noted that none of the counties where this project is proposed are designated nonattainment for any criteria pollutants, including ozone and particulate matter.

OZONE Meeting ozone standards provides important public and environmental health benefits. EPA has worked closely with states and tribes to identify areas in the country that meet the standards and those that need to take steps to reduce ozone pollution. EPA's final designations are based on air quality monitoring data, recommendations submitted by the states and tribes, and other technical information. Most of Arkansas is listed as **Unclassifiable / Attainment**. Scott County, Arkansas, falls within this category. See the adjacent map. (Environmental Protection Agency / 2008 Ground-level Ozone Standards as required by the Clean Air Act Region 6 Final Designations, April 2012) See EPA Map in **Appendix A**. <http://www.epa.gov/ozonedesignations/2008standards/final/region6f.htm> (9/23/14)

While air quality monitoring describes ambient pollution levels, emissions inventories provide information on the contribution of various pollution sources to total emissions for specific geographic areas. Emissions from prescribed fires are unlikely to be a significant contributor to ozone. In much of the rural South, ozone formation tends to be NO_x-limited and prescribed fires are usually not a major NO_x source when compared to others, such as vehicles. Also, the amount of NO_x and VOC coming from forestry activities is small compared to other sources. And most importantly, weather and climate conditions in this area tend to preclude prescribed burning from becoming a significant contributor to ozone formation. Most ozone events occur in mid-spring through late summer when hot temperatures and high-pressure air masses may stagnate over an area, and pollution is not dispersed. Prescribed burning is not typically conducted under these types of weather conditions because of the smoke dispersion issues.

PARTICULATE MATTER (PM 2.5) The project area is located in Scott County, Arkansas and is listed as **Unclassifiable / Attainment** per a letter to Ron Curry, Regional Administrator, U.S. Environmental Protection Agency, Region VI, from Governor Mike Beebe dated December 5, 2013. All monitored counties in Arkansas currently meet the existing primary and secondary PM^{2.5} Standards with the exception of Pulaski County, which would exceed the new Primary Standard based on the Design Value for calendar years 2010-2012. However, based on the data collected to date for 2013, we expect all Arkansas counties to attain the Standards by the time EPA makes final designations in 2014. For this reason, Arkansas is making a preliminary designation recommendation of attainment or unclassifiable for all Arkansas counties. Final designation recommendations will be submitted when the 2013 data is complete and quality assured, based on the 2013 Design Value.

ENVIRONMENTAL EFFECTS

PROPOSED ACTION

PROJECT DESIGN FEATURES AND MITIGATION MEASURES

Fine particulate matter is emitted from prescribed fires and is a contributor to ambient levels of this pollutant. Within the county where burning is proposed, prescribed fire emissions currently account for nearly 84% percent of all fine particulate emissions (1,236 tons/year from fires compared to 1,474 tons/year total emissions). In the state of Arkansas, prescribed fire emissions account for 50.6% of all fine particulate matter emissions (72,256 tons/year from fires compared to 142,824 tons/year total emissions). Other sources of fine particulate emissions include fuel combustion and operations at industrial facilities, waste disposal and recycling operations, construction, and agricultural activities. The source for the above data is EPA's National Emissions Inventory for 2011, available online at <http://www.epa.gov/ttnchie1/trends/> (9/23/14) and ftp://ftp.epa.gov/EmisInventory/2011/2011neiv1_eventfire_countyscc_caphap.zip (9/23/14).

The proposed prescribed burning is compatible with the Forest Plan, the desired conditions, and the standards within each management prescription that falls within the project area. The following effects are based on the prescribed fires being implemented in compliance with the USDA Forest Service Southern Region's Smoke Management Guidelines, dated September 2010. The smoke management objectives set forth in the guidelines are as follows:

- Minimize the amount and concentration of smoke entering populated areas;
- Prevent / minimize public health and safety hazards, including
- Impacts to sensitive sites (schools, hospitals, etc.), and
- Visual impairment on highways, airports, etc. (both day and night);
- Avoid exceedances of the National Ambient Air Quality Standards (NAAQS); and
- Protect visibility in Class I Areas.

Additionally, the guidelines require that burn plans be prepared to ensure that the smoke management objectives meet USDA policy that prescribed fires may not cause or contribute to an exceedance of a National Ambient Air Quality Standards.

Burn planning will include the appropriate analysis procedures to evaluate downwind smoke concentrations to ensure protection of public health and safety.

Calculations of emissions from the proposed project were also conducted to assess the increase in emissions loading in the project area and throughout the state. The emissions were calculated using a range of consumption values (in tons per acre) for each unit based on best available information and professional judgment (Region 8 Air Quality Specialist Melanie Pitrolo). Consumption is assumed to be between two and four tons per acre (Scott County mostly averages 3 tons per acres), with an average emission factor of 12 pounds of fine particulate matter per ton of fuel consumed. Calculations of emissions from the proposed units show that the resulting emissions increase as a result of this project range averages 75 tons per year. The following calculation was used:

$$4,149 \text{ burn acres} \times 3.0 \text{ tons per acre} \times 12 \text{ (average emission factor)} \text{ divided by } 2,000 = 74,682$$

All prescribed burning activities on the Ouachita National Forest, including those proposed in this action, are conducted in accordance with the Region 8 Smoke Management Guidelines in order to alleviate the smoke related impacts outlined above. Smoke management planning in accordance with the Region 8 Smoke Management Guidelines has been successful in protecting health and safety during past activities. The Guidelines require that smoke dispersion modeling be conducted for most burn units to ensure that the smoke management objectives are met; if modeling shows potential impacts, adjustments or mitigations will be necessary in order to go forward with the burn. Each burn unit will be planned in accordance with the Guidelines such that specific parameters are met, including wind speeds and directions. While a few larger units have the potential to transport smoke beyond the National Forest, potential impacts will be mitigated by burning with a wind direction away from the Forest boundary.

Mitigation measures in the form of 'priorities and objectives' and 'design criteria' (Revised Forest Plan, pgs. 62-69 and 73-97) are included under all action alternatives to minimize potential for these effects. Key is the development of a burning plan prior to implementation that considers wind direction and other smoke dispersal factors. A burning plan would be prepared for each burn to ensure that the combustion products (smoke) do not intrude into smoke-sensitive areas. Burning would only occur when conditions are right for adequate smoke dispersal away from smoke sensitive areas (burn plan would address prescription parameters). Proposed burn areas under the Proposed Action are large enough for efficient burning and small enough to allow burning to be completed by mid-afternoon (1500–1630 hrs), so that most smoke is dispersed by nightfall when smoke tends to sink down slope into valleys. Prescribed burning would be spread over time and space to minimize local cumulative smoke effects. With these measures, effects from smoke under the Proposed Action are expected to be small and within federal and state acceptable levels. Based on existing air quality information, no long-term adverse impacts to air quality standards are expected from the proposed project. The proposed project is designed to ensure that the Regional Smoke Management Guidelines are followed, and as such does not threaten to lead to a violation of any Federal, State or Local law or regulation related to air quality.

NO ACTION ALTERNATIVE I

Since this alternative does not include prescribed burning, it would have negligible potential for directly affecting air quality. Indirectly, there may be potential hazards from smoke, if a wildfire occurs, due to reduced visibility and nuisance perspective.

NO HERBICIDE ALTERNATIVE II

The effects on air quality would be the same as the Proposed Action. The only difference between the Proposed Action and this alternative is that herbicide use is not proposed in this alternative.

NO ROAD CONSTRUCTION ALTERNATIVE III

The effects on air quality would be the same as the Proposed Action.

SOILS

Geographic Boundary and Analysis Tools Used

The geographic boundary for the effects on soil quality would be the boundary of all compartments within *West Haw Creek*. Timelines for measuring the effects on soils would be 15 to 25 years between re-entry periods. The Universal Soil Loss Equation (USLE) model was used to calculate potential erosion. Soils Resource Reports were also prepared by Forest Soil Scientist, Jeff Olson, December 2015.

Present Conditions

Soil maps and mapping unit descriptions and interpretations are based upon the fact that different soil types result from different combinations of geology, geomorphology, topography, vegetation and climate which influence land use activities, capabilities, and various interpretations for management. The nature, patterns and extent of these soils give each mapping unit its own set of interpretations for use and management. The Soil Resource Inventory for the West Haw Creek Project has identified **8** soil mapping units in the project area. Soil properties and associated management implications/precautions of these soil units were analyzed with respect to the proposed practices within each alternative. See project file for the Soil Mapping Unit Legend, Soil Mapping Unit Descriptions, and Soil Map.

ENVIRONMENTAL EFFECTS

PROPOSED ACTION and No Herbicide Alternative

Erosion. Erosion is the detachment and transport of individual soil particles by wind, water, or gravity. Soils are considered detrimentally eroded when soil loss exceeds soil loss tolerance (Forested T-factor) values. Ground disturbing management practices influence erosion principally because they remove vegetative ground cover and often concentrate and channel runoff water. Forested T-factors and the soils susceptibility to erosion vary by soil and mapping unit. Soils with higher K-factor values and those soil map units with severe erosion hazard ratings require more intensive management efforts to reduce the potential for accelerated erosion both during and after the soil disturbing activity. Erosion can best be managed to stay within the Forested T-factor values by leaving sufficient amounts of the forest floor, slash and other onsite woody debris material which typically dominates an effective surface cover, not overly compacting soils which would reduce water infiltration rates and result in increased overland flow rates, and not allowing water to concentrate and channel on roads, skid trails and landings.

The Revised Forest Plan Forest-wide design criteria identify maximum allowable soil loss thresholds (pp. 74-75). In order to determine whether the proposed actions meet these criteria, the Universal Soil Loss Equation (USLE) was used to calculate soil loss resulting from proposed treatments. For this analysis, since no activities are proposed on areas with a severe erosion hazard, the worst case-modeling scenarios were analyzed for soil map units with a moderate erosion hazard potential, which would be impacted by the most intensive soil disturbing management actions.

The total calculated soil loss for the proposed management activities and the maximum allowable soil loss for three-year recovery period are displayed in the table below. These values are based on adequate implementation of erosion control treatment of log decks, temporary roads and primary skid trails (scarification, waterbar and seed).

Comparison of Proposed Action and Allowable Soil Loss

Soil Map Unit#	Compartment/ Stand	Treatment	Soil Loss (tons/acre)	
			Proposed Action	Allowable
130	1268—stand 2	Shelterwood and Site Preparation	6.21	8.10
130	1290—stand 20	Shelterwood and Site Preparation	7.16	8.10
33	1278—stand 1	Clearcut and Site Preparation	3.14	8.55

These worst-case scenarios meet the Forest criteria of staying within the allowable soil loss Forested T-factor. These treatment units, along with other proposed treatment units of less intense soil disturbing management actions, would remain within acceptable limits over the entire project area when erosion control measures are adequately implemented.

The wildlife ponds to be developed in the watershed would be approximately ¼ to ½ acre in size. The resultant soil exposure would be temporary. The ponds would be constructed on gently sloping sites and, after construction, would act as a barrier to downstream movement of sediment. Planting grasses, clover, and other herbaceous vegetation would reduce the time required for pond site stabilization to less than four months. The ponds would not be constructed in any riparian areas, and would be located away from any perennial stream channels. These measures would limit potential soil erosion and sedimentation to within acceptable levels.

During prescribed burning actions sufficient amounts of unburned material will be left intact to minimize erosion. Burns would be prescribed and implemented such that not more than 20% bare soil will be exposed on units receiving fuels reduction or wildlife enhancement burns, and not more than 30% bare soil will be exposed on units receiving site prep burns. Only the upper forest floor litter layer consisting of non-decomposed or semi-decomposed pine needles, leaves and small twigs would be expected to be consumed. This will leave the underlying forest floor layer, which consists of more decomposed needles, leaves and twigs, to protect the mineral soil. This remaining organic layer, along with the trees and other living vegetation on the site, should prevent or minimize most soil movement. After prescribe burning operations, all firelines will be water barred, seeded, and fertilized.

Compaction. Compaction increases soil bulk density and decreases porosity as a result of the application of forces such as weight and vibration. Compaction can detrimentally impact both soil productivity and watershed condition by causing increased overland flow during storm events and reduced plant growth due to a combination of factors including reduced amounts of water entering the soil and its reduced availability to plant growth, a restricted root zone, and reduced soil aeration. It is generally acknowledged that all soils are susceptible to soil compaction or decrease soil porosity. The soils in this planning area are most susceptible to compaction when wet.

The soil resource inventory identified approximately 13% of the area has soil map units with a moderate-high, high or severe compaction hazard rating. These hazard ratings are primarily due to low proportions of rock content in the top 6-inches of soil. This situation, when combined with heavy equipment operation on wet soils, can result in unacceptable levels of compaction. To ensure that compaction effects are kept within acceptable levels, additional mitigation would be implemented. On soils with a moderate-high or high compaction hazard rating, logging would be limited to the drier periods of the year, namely April through November. On soils with a severe compaction hazard rating, logging would be limited to a July through November operating season. (Stands proposed for limited operating seasons are listed in Chapter 2, technical requirements). Even during these drier periods, extra care would be taken to monitor soil conditions and suspend operations when soils become wet. Given this mitigation, soil compaction would be limited and is not expected to impair soil productivity.

Fire effects on soil. Prescribed fire may affect soils positively or negatively. Positive effects include enhancement of nutrient availability and phosphorus cycling and reduction of soil acidity. Negative effects include excessive soil heating that can kill soil biota, alteration of soil structure, destruction of organic matter, and loss of site nutrients through excessive volatilization. Soil erosion and additional nutrient loss through leaching may occur later during rainstorms. Any long-term negative effects to the soil would be related to high severity burns or very short (less than three years) frequency of the burns. Typical burn severity would be limited by established burning parameters and mitigation measures designed to protect soils and overstory trees and to minimize risk of escape. These parameters result in retention of enough leaf litter to protect soil from the negative effects listed above in most cases. Underburn frequencies would be three-years or greater, which would allow recovery of forest floors and soil biota and would not deplete soil nutrients.

Prime Farmland

In the project area, there is one soil map unit (with one map unit delineations totaling about 476 acres - #54, Kenn gravelly fine sandy loam, 0 to 2 percent slopes, occasionally flooded) which is classified as *Prime Farmland*, but only if it is protected from flooding.

Floodplains, Riparian Areas, Jurisdictional Wetlands and Municipal Watersheds. Soil mapping units, which are subject to flooding (indicated in the unit name) and/or as having hydric soils as a major component, require special management considerations and evaluations so that proposed actions will not adversely alter the natural values of these areas. Soil mapping units 54 and 55 delineate areas that contain floodplains and possibly other areas that have a risk of flooding. These units give an approximate determination of areas in which the probability of flooding in any given year is at least 1 percent (100-year recurrence) at higher elevations and increases as elevation decreases within the mapping unit. Evaluations should be made on all floodplains and wetland locations involving existing or planned structures (i.e. Bridges, roads, buildings, or other development) regardless of floodplain width or wetland size. In this analysis area, there are no hydric soils or jurisdictional wetlands mapped. The water quality in this project area currently meets the provisions of the Clean Water Act and state water quality standards. *West Haw Creek* has some riparian areas, but no municipal watersheds. For detailed information, reference E.O. 11988, E.O. 11990, FSM 2526 and FSM 2527.

Cumulative Effects. Effects from past actions are no longer impacting the soil resource. There are no present actions impacting the soil resource. There is always the potential for a wind or insect/disease event that would result in salvage or sanitation harvests within the same areas proposed for harvest under this project. Because salvage or sanitation harvests in response to these natural events would also follow the Revised Forest Plan guidance designed to protect the soil resource, any additive effect would be minimal.

NO ACTION ALTERNATIVE I

Only the undisturbed natural erosion would be expected to continue. Natural erosion from undisturbed forest soils is very low, generally in the neighborhood of 0.01 to 0.15 tons/acre/year (Soil Resource Report). There would be no management activities conducted on forest soils; no compaction would occur. No cumulative effects would occur because no management activities would be conducted under the No Action Alternative; there would be no additive effect.

NO HERBICIDE ALTERNATIVE II

The effects of this alternative would be the same as the Proposed Action.

NO ROAD CONSTRUCTION ALTERNATIVE III

The effects of this alternative would be the same as those described resulting from the Proposed Action, except fewer acres of soil would be impacted.

WATER RESOURCES AND QUALITY

Present Conditions

The West Haw Creek Project area has one 6th level watershed, Haws Creek. Haws Creek runs east and west while Cedar Creek runs a short distance in the western part of the project area.

The primary beneficial use for the streams and tributaries in the West Haw Creek Project Area is recreation, which provides for the protection and propagation of aquatic life.

Watershed Condition Ranking (WCR) is a risk ranking that is the result of the Aquatic Cumulative Effects (ACE) model calculations of High, Moderate, or Low, based on variables impacting sedimentation in streams. The primary variables driving WCR are land use classification and road density.

The modeled WCR for the **Haws Creek (111102050203)** in the West Haw Creek Project Area is moderate, indicating environmental effects are measurable and observable for short periods of time following storm flow events. These effects are short term (less than a few weeks) and do not affect large portions of the watershed. Recovery is complete and beneficial uses are disrupted only for short periods in localized areas. Monitoring of aquatic biota is recommended to determine the severity of adverse effects. In addition to the application of forest standards and BMPs, monitoring is required. See Watershed Map in [Appendix A](#).

Also contained within the project area are 33 existing ponds (¼ to ½ acre in size). The primary beneficial use of the ponds is water supply for wildlife.

Fish Passage Crossings

The road analysis inventory showed 6 fish passage crossings, (1 Natural Ford, 3 bridges, and 2 slabs). Out of these stream crossings the data showed that none of them have a fish passage problem. All fish passage culverts to be replaced will be designed to meet fish passage guidelines.

ENVIRONMENTAL EFFECTS

PROPOSED ACTION

Non Herbicide Treatments

A direct effect of management activities on water quality occurs when an activity places a pollutant directly into a watercourse.

Road maintenance and/or construction, fireline construction and reconstruction and timber management activities such as construction of skid trails, temporary roads and log landings could result in increases in erosion and sedimentation. Roads contribute more sediment to streams than any other land management practice (Gucinski et al., 2000).

While it is impractical to eliminate all soil from entering a stream, it is possible to limit it from directly entering streams through design and implementation of Best Management Practices (BMPs). BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate introduction of pollutants into receiving waters. BMPs are a management and planning system in relation to water quality goals, including both broad policy and site-specific prescriptions. Within the Revised Forest Plan, standards are synonymous with BMPs.

Monitoring is used to determine implementation and effectiveness of management activities. Reviews of individual BMPs and combinations of BMPs across the ONF have shown that management activities such as temporary road crossings or timber harvest in combination with SMA buffers do not have a significant adverse effect on beneficial uses (Clingenpeel, 1989; Clingenpeel, 1990; Neihardt, 1994; USDA Forest Service, 1994; Vestal, 2000). Based on results of research and monitoring efforts and mandatory implementation of Revised Forest Plan standards, an adverse direct effect resulting from these proposed management actions would be unlikely.

Indirect effects are those impacts from management activities that do not have a direct connection to the stream course. The indirect effects would include increased runoff and peak flows as a result of vegetation removal and compacted surfaces, which result from road and landing construction and from harvest activities. The disturbed surfaces resulting from the above activities and increased flows could cause increases in erosion and sediment delivery to channels. Miller, Beasley and Lawson (1985) demonstrated in harvest treatment areas that peak flows and sediment yield did not increase significantly.

The effect of nutrients released to streams as a result of management activities is also an indirect effect. Beasley, Miller and Lawson (1987) statistically found no effect from selection harvesting and only a temporary effect for one year after clear cutting. Because of the dilution of untreated areas, and the limited amount of site rehabilitation harvest, the effect of nutrients released to streams would not likely be a significant impact to water quality over time.

Based on results of research and monitoring efforts and mandatory implementation of BMPs, an adverse indirect effect resulting from these proposed management actions would be unlikely.

Herbicide Treatments (Significant Issue)

Herbicides are only proposed for the treatment of non-native invasive species and as a last resort to restock areas of regeneration harvests. The Proposed Action proposes herbicide application with glyphosate (Round-up®, Accord® or equivalent products), triclopyr (Garlon 4®, 3A or equivalent products), or Imazapry (Arsenal, Chopper or equivalent products) as backup treatments for hard to kill non-native species or stocking of regeneration stands. Application would be by cut surface application, tree injection, and foliar or basal spray application method. The amount treated would be very small on individual species when found, however the following still applies.

When herbicides are applied, there is a risk that the chemical could move offsite, possibly entering streams, ponds, lakes, or infiltrate ground water by vertical seepage into aquifers. The Forest Service has specific regulations for the use and application of herbicides, and the Ouachita NF adheres to additional design criteria for herbicide application in the Revised Forest Plan. When all BMPs or regulations are implemented, there should be no significant movement of herbicide offsite.

Only 211 acres of reforestation treatments using herbicide is proposed and is outside streamside protection areas. All streams perennial and intermittent would be protected, by 100 and 30-foot herbicide application buffers and; all source waters would be protected by 300-foot buffers. Buffers are to be clearly marked (herbicide standard HU006) before treatment so applicators can easily see and avoid them (USDA Forest Service, 2005a). No direct, indirect or cumulative effects from proposed herbicide reforestation activities are anticipated.

Direct effects could occur from herbicide application for aquatic non-native invasive species and indirect effects when treating terrestrial invasive plant species within SMAs, but effects would be minimal due to approximately 99% of invasive species treatments occurring outside streamside management area protection buffers (aquatic habitats) and following RFP protections and conservation measures. The RFP only allows herbicide use within MA 9 for control of vegetation on dams or for control of invasive and/or exotic species. Application would be approved by the Forest Supervisor following site-specific analysis and a monitoring plan (design criteria 9.13). Only a non-soil active herbicide with appropriately labeled formulation for both aquatic and terrestrial site use would be used. Application of herbicide specimen label rates for each chemical would be followed and applied rates would be at or below the recommended application rate.

Herbicide monitoring across the Forest has found only trace amounts of herbicide have ever been detected in streams. Herbicide applications were monitored for effectiveness in protecting water quality over a five-year period on the Ouachita NF (Clingenpeel, 1993). The objective was to determine if herbicides are present in water in high enough quantities to pose a threat to human health or aquatic organisms. From 1989 through 1993, 168 sites and 348 water samples were analyzed for the presence of herbicides. The application of triclopyr for site preparation and release was included in the analysis. Of those samples, 69 had detectable levels of herbicide. No concentrations were detected that would pose a significant threat to beneficial uses. Based on this evaluation, the BMPs used in the transportation, mixing, application and disposal were determined to be effective at protecting beneficial uses. No cumulative effects are anticipated due to RFP standards, BMP and the small amount of area potentially impacted.

NO ACTION ALTERNATIVE I

Although proposed soil disturbing activities resulting in stream sedimentation would not occur, watershed improvement activities, such as road decommissioning and fish passage restoration improvements would also not take place.

NO HERBICIDE ALTERNATIVE II

The effects of management activities would be the same as those described above except the listed effects from herbicide would not occur.

NO ROAD CONSTRUCTION ALTERNATIVE III

The effects of management activities would be the same as those described above except the listed effects from road construction would not occur.

Cumulative Effects

For purposes of this analysis, an Aquatic Cumulative Effects (ACE) model was used. The ACE model predicts sediment yields to determine cumulative effects on water quality and associated beneficial uses. The objective of this analysis is to determine possible cumulative effects of management activities on water quality and its associated beneficial uses. Derived from the ACE model a low watershed condition ranking indicates there is no risk that effects would rise to a level threatening violation of any water quality standard or administrative limits. A moderate watershed condition ranking indicates potential for short term adverse effects from sediment to aquatic beneficial uses. A high watershed condition ranking indicates environmental effects maybe persist and can change hydrologic systems with observable changes for as long as the causative actions persist. Monitoring of Aquatic biota can be conducted to determine severity of adverse effects.

Local research has shown that effects of increased sediment as a result of timber harvests are identifiable for up to 3 years (Miller, Beasley and Lawson, 1985). Three years prior and the year of implementation bind the timeframe of the ACE model. This captures the effect of other management activities that may still affect the analysis area. Proposed actions are assumed to occur within 3 to 5 years, this will express the effects that could occur. This is consistent with most project level environmental analyses that have an operability of five years. Past activities that have a lasting effect such as roads and changes in land use are captured by modeling sediment increase from an undisturbed condition (results of monitoring on the ONF indicate there are no adverse cumulative effects when Forest standards are followed). Background information on the process and data used to predict sedimentation is on file at the Cold Springs Ranger District office. Wildlife treatments such as midstory reductions would be implemented by crews using chainsaws and would not result in any soil disturbance, but have been added as a treatment for analysis. Firelines would use recently reconstructed roads or maintained roads where possible. By the time prescribed burning, scarification or wildlife treatments are conducted, any sediment contributed from road construction or harvest actions would be stabilized or returned to or near normal conditions (USDA Forest Service, 2005c, p 5).

The objective of this analysis is to determine possible cumulative effects of management activities on water quality and its associated beneficial uses. Two methods were used to address cumulative effects. First changes in land use and disturbance with respect to increases in sediment were modeled using the ACE model. Stream surveys would be conducted in the spring of 2016 and take place prior to project implementation because this watershed is at a medium risk and the predicted increase in sediment would be 12 percent according to the ACE model. Cumulative effects analyses are bounded in space and time. For purposes of project level planning, 6th level watersheds are appropriate spatial bounds for this cumulative effects analysis. The table below displays beginning and resulting watershed condition rankings as predicted by the ACE model for the watershed within the project area.

Sediment Delivery by Alternative

Subwatershed 6 th level HUC ID#	Alternative	Sediment Delivery		Risk Level
		Additional Tons Per Year	% Increase*	
Haws Creek 111102050203	<i>Current Condition</i>			Low
	No Action	67.49	3.6	Moderate
	Proposed Action & No Herbicide	292.27	12.0	Moderate
	No New Road Construction	187.95	6.4	Moderate

*Percent increase over sediment delivery from an undisturbed condition

Forest Service objectives are to maintain or improve health through implementation of Revised Forest Plan standards and Arkansas State BMPs. Sediment delivery will be reduced as a result of proposed road closures.

The Proposed Action, Alternative II, and Alternative III (No Road Construction) include plans to permanently close 3.75 miles by road obliteration. Also, an additional 6.2 miles of system roads have been obliterated by nature. The 2.0 miles of System Road Reconstruction (Proposed Action, Alternative II, and Alternative III) and 1 mile of construction (Proposed Action and Alternative II) will not increase the open road density (travel analysis report on file at district office), and will contribute less sediment to waterways.

WILDFIRE HAZARDS AND/OR FUELS

Present Conditions

Fuel loads in *West Haw Creek* continue to accumulate between prescribed burns and normal events and processes such as storms, insects and disease, needle cast, and leaf litter. Fuels can increase from 4-6 tons per acre to 8-10 tons per acre after years without prescribed burning. Prescribed burning conducted on the Ouachita National Forest typically reduces fuel loading on a unit by one to three tons per acre.

With repeated burns, fuel loading in a burn unit can be maintained at approximately three to four tons per acre. Prescribed burning to significantly reduce hazardous fuels in this project area was last conducted in 2010 in the southern portion of the project area. See Burn Map in [Appendix A](#). Not all the area has been burned in recent years. Currently fuels are accumulating because of seasonal storms, continuous disease and insect infestations, and natural accumulations of fuel buildup that starts immediately after a prescribed burn. The area needs burned for habitat improvement of the Red-cockaded woodpecker. The acres that have been previously burned were done in basically the same burn blocks in different years. Natural fuel buildup and various weather events continuously increase wildfire hazards in *West Haw Creek* and creates unsuitable RCW habitat. The understory and midstory also increases as a result of resprouting and fuel buildup between prescribed burns.

ENVIRONMENTAL EFFECTS

The geographic boundary for the effects on wildfire hazards and fuels would be the entire *West Haw Creek* and the immediate forested areas surrounding *West Haw Creek*. Timelines for measuring the effects are current fuel and future fuel buildup for the next 10 to 15 year period. The analysis method would be by field observations and monitoring of fuels after burns.

PROPOSED ACTION, ALTERNATIVE II, ALTERNATIVE III AND THE NO ACTION ALTERNATIVE I

There are 4,149 acres of prescribed burning proposed in the action alternatives on a 3-5 year rotation for this project. Approximately 2.81 miles of new firelines and 16.4 of reconstructed firelines are proposed in the Proposed Action and Alternative II. Alternative III consists of 2.81 miles of new fireline and 14.87 miles of reconstructed firelines.

Fuel management is implemented through normal program planning. Other resource areas such as timber and wildlife may initiate projects that also benefit fire management through fuel modification by use of prescribed fire. Burn plans would be developed to provide protection for soil and water while achieving the resource management objectives. Prescription elements would include such factors as fire weather, expected fire behavior, slope, aspect, soil moisture, fuel moisture, relative humidity, mixing heights, wind speed and direction, fuel loads, and any other indicator that may influence fire intensity.

A direct effect of a prescribed burn executed under controlled conditions would reduce fuel accumulations which would reduce the heat intensity of a fire should it occur afterwards. Areas that have not been previously controlled burned, have a tendency to burn hotter and are more likely to kill live standing timber and remove the soil protecting litter layers.

CUMULATIVE EFFECTS

Cumulatively, with each successive prescribed burn, less intense fires would resemble natural fire events that were common before fire suppression activities were begun. With each prescribed burn, less fuel would be available to burn and native species would increase that benefit from periodic fire. Eventually stand replacing wildfire would become less likely, easier to control or manage, and burn under moderate conditions.

TRANSPORTATION AND INFRASTRUCTURE

Present Conditions

There are 4,149 acres of NF and 98 acres of private land resulting in approximately 8.03 sq. miles. There are 18.16 miles of total existing roads (both open and closed). Of these roads, 12.01 miles are currently opened. The current open road density is 1.50 mi./sq. mile exceeding the 2005 Revised Land and Resource Management Plan criteria of 0.75 miles per square mile. There are some culverts that may need replaced or maintained. See maps at the end of this section.

ROADS THAT PROVIDE DIRECT ACCESS TO THE PROJECT AREA.

AR HWY 248 provides the main access to the West Haw Creek EMU project area. AR Highway 248 runs East and West to the North East of the West Haw Creek EMU. Forest Service Roads and Scott County Roads provide access to this EMU.

ROADS WITHIN THE PROJECT AREA.

Forest Service Road 32 – This is also a single lane, ditched and piped road under County jurisdiction and Forest service maintenance. The variety of users includes residents, hunters, recreation, and forest administration. This road is in good condition but does have an area that needs surfacing. This road is an open road.

Forest Service Road P92 - This is a single lane, ditched road with lead off ditches under Forest Service jurisdiction, and Forest Service maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in good condition due to its location on top of the ridge. There is brush growing up in the edge of the road. This road is open per the MVUM.

Forest Service Road 32E – This is a single lane, ditched, and piped road under Forest Service jurisdiction and maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in very poor condition with three large pipes washed out, along with lots of other pipes that are rusted out, as well as brush encroaching into the road bed. This road is open year round per the MVUM.

Forest Service Road 32A – This is a single lane, ditched, and piped road under Forest Service jurisdiction and maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in poor condition due to brush growing up in the ditches and some surface erosion. This road is open year round per the MVUM.

Forest Service Road 42 -- This is a single lane, ditched, and piped road under Forest Service jurisdiction and maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in fair condition but does have a lot of brush grown up in the ditches and some erosion. This road is seasonally closed per the MVUM.

Forest Service Road P78L - This is a single lane, ditched, and piped road under Forest Service jurisdiction and maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in fair condition but does have brush growing up in the ditches and rusted out pipe. This road is closed round per the MVUM.

Forest Service Road P68D – This is a single lane, piped and ditched, road under Forest Service jurisdiction and Forest Service maintenance. The variety of users includes hunters, and forest administration. This road is in poor condition but does have a lot of brush growing up in the road bed. This road is closed per the MVUM.

Forest Service Road P68C – This is a single lane, ditched, and piped road under Forest Service jurisdiction and maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in fair condition but does have a lot of brush growing up in the ditches. This road is closed year round per the MVUM.

Forest Service Road P68 – This is a single lane, piped and ditched road under Forest Service jurisdiction and maintenance. The variety of users includes forest administration. This road is in fair condition except for brush growing up in the ditches. This road is closed per the MVUM.

Forest Service Road 89 – This is a single lane, piped and ditched road under Forest Service Jurisdiction and Forest Service maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in good condition due to reconstruction from a previous timber sale. This road is open per the MVUM.

Forest Service Road P69 – This is a single lane, out sloped road under Forest Service Jurisdiction and Forest Service maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in poor condition due to brush growing up in the ditches. This road is open per the MVUM.

Forest Service Road 6767 – This is a single lane, piped and ditched road under Forest Service Jurisdiction and Forest Service maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in poor condition due brush growing up in the ditches and rusted out pipe. This road is open per the MVUM.

Matrix for Existing Roads Inside West Haw Creek EMU

Road Number	Road Name	Jurisdiction	Length (Miles)	Current Management Status	Future Management Status	Maintenance
32	Bates – Haw Creek	C	5.3 (2.65)	O	O	FS
P92	Price	FS	2.0 (1.0)	O	O	FS
32E	Haws	FS	1.90	O	C	FS
32A	Haw Creek	FS	2.3	O	O	FS
42	Orchard	FS	1.45	SO	SO	FS
P78L	Cherry	FS	1.30	C	C	FS
P68D	--	FS	1.50	C	C	FS
P68C	--	FS	0.60	C	C	FS
P68	Spike	FS	1.30	C	C	FS
89	Walker Mt	FS	0.91	O	O	FS
P69	--	FS	1.40	O	O	FS
6767	Love Creek	FS	1.85	O	C	FS
TOTAL			18.16			

() = boundary road, ½ length.

ROADS OUTSIDE THE ANALYSIS AREA

Matrix for Existing Roads Outside West Haw Creek EMU

Road Number	Road Name	Jurisdiction	Length (Miles)	Current Management Status	Future Management Status	Maintenance
SC 2	--	C	--	O	O	3 and 4
32	Bate – Haw Creek	FS	--	O	O	3
89	Walker Mt	FS	--	O	O	3

Forest Service Road 32 – This is also a single lane, ditched and piped road under County jurisdiction and Forest service maintenance. The variety of users includes residents, hunters, recreation, and forest administration. This road is in good condition but does have an area that needs surfacing. This road is an open road.

Forest Service Road 89 – This is a single lane, piped and ditched road under Forest Service jurisdiction and Forest Service maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in good condition due to reconstruction from a previous timber sale. This road is open per the MVUM.

Scott County Road 2 – This is also a single lane, ditched and graveled road under County jurisdiction and County maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in good condition. This road is open.

ROADS TO BE REMOVED FROM THE FOREST SERVICE SYSTEM ROADS

The back portion (1.30 miles) of Forest Service Road 54A is not needed and should be obliterated. There are 13 other roads currently listed as system roads that need to be removed from the system as they have been obliterated by nature due to their poor locations.

Road #	Name	Length mile	Action
P68A	--	1.90	OBLITERATED BY NATURE
P68B	--	1.00	OBLITERATED BY NATURE
P68C	--	0.50	OBLITERATED BY NATURE
P68D	--	1.10	OBLITERATED BY NATURE
P78A	--	0.50	OBLITERATED BY NATURE
P78E	--	0.40	OBLITERATED BY NATURE
P78F	--	0.40	OBLITERATED BY NATURE
P78J	--	0.40	OBLITERATED BY NATURE
TOTAL		9.95	

ENVIRONMENTAL EFFECTS

The geographic bounds for this project include the transportation system within *WEST HAW CREEK* and portions of roads outside of the project area. Timelines for measuring the effects would be until all activities proposed are completed. The method of analysis for the transportation system in this project area is the Travel Analysis Process – West Haw Creek that was completed in September 2015, utilizing GPS data.

PROPOSED ACTION

The Proposed Action would include approximately 1.0 miles of road construction, 2.0 miles of road reconstruction, 9.05 miles of prehaul maintenance, 14.0 miles of temporary road construction, and 9.95 miles of road obliteration. Normal and emergency road maintenance would be done on existing open roads. All stream crossings with culverts being replaced would be engineered with adequate fish passage structures. The future open road mileage would remain at 1.03 miles per square mile exceeding the guidelines of the Revised Forest Plan. Open roads are either through roads or county roads that cannot be closed at this time. This alternative would reduce the distance between culverts and replace nonfunctioning culverts, which would have an indirect effect by reducing sediment from roads in the watershed. The proposed transportation work would allow for timber harvesting, prescribed burning, silvicultural treatments, wildlife work as well as safe public access.

See Transportation Map in [Appendix A](#).

CUMULATIVE EFFECTS

These activities would have a cumulative effect of improving forest health, wildlife habitat, forest recreational opportunities and safety.

NO ACTION ALTERNATIVE I

The direct effect of this alternative is that no roadwork would be done on many interior roads. Normal and emergency road maintenance would be done on existing open roads. The indirect effects would include the continued deterioration of roads, washed out stream crossings, rusted out culverts, and long distances between cross drains. Sediment from the road would eventually increase.

CUMULATIVE EFFECTS

Cumulative effects would be a road system that does not meet Forest Service standards, which provides safe access and reduces erosion and sediment problems.

NO HERBICIDE ALTERNATIVE II

The effects on the transportation system would be the same as those in the Proposed Action since proposed treatments are the same, minus the effects of herbicide application.

NO ROAD CONSTRUCTION ALTERNATIVE III

This alternative would include approximately 2.0 miles of road reconstruction, 0 miles of TSL-D new construction, 7.59 miles of prehaul maintenance, 0 miles of temporary road construction, and 9.95 miles of road obliteration. Normal and emergency road maintenance would be done on existing open roads. All stream crossings with culverts being replaced would be engineered with adequate fish passage structures. This alternative would reduce the distance between culverts and replace nonfunctioning culverts, which would have an indirect effect by reducing sediment from roads in the watershed. The proposed transportation work would allow for most timber harvesting, prescribed burning, silvicultural treatments, wildlife work as well as safe public access. There are no other past, present, or reasonably foreseeable future actions affecting transportation or infrastructure; no cumulative effects would result from implementation of this alternative.

VEGETATION

Present Conditions

West Haw Creek contains a distribution of pine and pine/hardwood (3,548 acres or approximately 85.5%) and hardwood and hardwood/pine (601 acres or approximately 14.5%) forest types that cover rolling hills, steep, and moderately steep side slopes. There are approximately 3,299 acres of National Forest system land identified as suitable for timber harvest to manage for sustained forest health and wildlife habitats. There is a wide distribution of age classes from 5 years of age to 105 years of age in pine and from 21 years old to 99 years old for hardwood species. Currently the 0-10 year age class has 10 acres of the suitable land on National Forest System land within *West Haw Creek*. Total mature pine and pine/hardwood acres (at least 70 years old and older) are 2,448 (approximately 59%) of the forested area. Approximately 2,082 acres (50% of the forested area) of these are *mature growth* pine 80 years old and older. There are 0 acres of *mature growth* hardwood or hardwood/pine (≥100 years old) present. However by the end of the next 10-year period there will be approx. 577 (13.9%) acres of *mature growth* hardwood/hardwood pine. These conditions would meet Forest Wide Design Criteria WF006 of the Revised Forest Plan.

Tree species common in these stands include various white oaks and red oaks, hickories, blackgum, sweetgum, and shortleaf pine with some encroachment of invader and offsite type species such as cedar and red maple. There is some red oak decline present but not as prevalent in *West Haw Creek* as in other parts of the district. The factors that contribute to oak mortality around the district are present here. These factors include hardwoods exceeding 70 years, high stem densities, and marginal site indexes (50 to 60). Drought has played a role in the amount of mortality and decline district wide. Dry years in 1998, 2000, 2001, 2002, August, September, October of 2004, October – December of 2005, January thru March of 2006 and the summer of 2011 and 2015 are still affecting the tree species on the district and forest. *West Haw Creek* has had a history of southern pine beetle and Ips beetle infestations. Because of the advanced age and stocking rates present these mature pine stands remain susceptible to insect infestations. Hardwood stands also become less resistant to insect and disease infestations with age. The ice storm of 2013 also caused stress and damage to all forest types which could invite various insects if followed by summer drought conditions.

Age Class Distribution for All National Forest Forested Land within the Project by Forest Type Projected For 2015

(Acres)						
Age Class	Pine	Pine/Hwd	Hwd/Pine	Hardwood	Acres	Percent
0 – 10	10				10	.24
11 – 20		28			28	.67
21 – 30	549		4		553	13.3
31 – 40	261				261	6.3
41 – 50	73				73	1.8
51 – 60	95				95	2.3
61 – 70	85	1	2		88	2.1
71 – 80	188	178			366	8.8
81 – 90	159	48	18		225	5.4
91 – 100	1,283	124	577		1,984	47.8
101 – 110	431	37			468	11.3
111 – 120						
121+						
Acres	3,133	415	601	0	4,150	
Percent	75.5	10	14.5	0		100

(Percentages in table are GIS acres.) *when individual stands are rounded off the total is 4,149 acres. Acres listed were used for vegetation acres and percentages (see "Detailed Proposed Actions table").

ENVIRONMENTAL EFFECTS

The geographic boundary for the effects on vegetation would be the boundary of all of the compartments within the *West Haw Creek* Ecosystem Management Unit boundary. Timelines for measuring the effects on vegetation would be a 10-15 year timeline from 2017 to 2027-2032, or from this entry to the next. Methods of analysis include interpreting the field data collected throughout the project area to establish existing and desired conditions. The proposed actions developed to meet the desired conditions are analyzed to determine what the direct effect of these actions would be and what the cumulative effects would be to the vegetation in the overstory, midstory, and understories.

PROPOSED ACTION

The proposed harvests are consistent with the Revised Forest Plan's direction to emphasize forest vigor and timber growing potential and sustainability in Management Area 22. It would also provide wildlife habitat diversity for various other wildlife species. The older stands in the unsuitable areas would also represent old growth conditions, a major ecological community of the Ouachita Mountains and the Arkansas Valley of Arkansas and Oklahoma.

The proposed harvests in Management Area 21 are consistent with the Revised Forest Plan's direction to emphasize the restoration and perpetuation of pine-grass old growth forests, woodlands, and other old growth conditions associated with frequent fire. Pine-grass old growth systems would provide habitat for a wide range of wildlife, including both late seral stage species and some open area associates. The perpetuation of old growth conditions are assured by core areas connected to replacement stands that are managed under long rotation (160 years) (Revised Forest Plan, pg. 39-40).

All Regeneration Stands (211 acres of new regeneration and 37 acres of previous regeneration) would have reforestation and timber stand improvement activities such as site preparation, release, and mechanical scarification. If activities are not successful, these areas would be ripped and planted with shortleaf pine. Herbicide may be used if objectives are not met following these activities. Regeneration stands should be stocked with a minimum of 150 seedlings per acre within 5 years after harvest. Activities are usually necessary to enable the young naturally established or hand planted seedlings to compete for growing space. Without the use of herbicide to control existing hardwood vegetation that is competing to occupy the site, the older hardwoods that have well established root systems would quickly "overtop" small pine seedlings. The shading effect would quickly kill young pine regeneration.

PROPOSED ACTIONS BY MANAGEMENT AREAS	MA 21	MA 22	
TIMBER HARVESTS	Old Growth	Pine/Bluestem/RCW	
Commercial Thinning 60 BA pine	915	1152	2067
Commercial Thinning 60 BA pine 10 BA hardwood	132	93	225
Commercial Thinning on 20' spacing (pole stands)	307	288	595
Subtotal of Commercial Thinning Harvests	1354	1533	2887
Clearcut Loblolly with Regen; Replant with Shortleaf Pine	0	57	57
Modified Shelterwood (Regeneration stands)	80	74	154
Subtotal of Regeneration Harvests	80	131	211
TOTAL HARVEST	1434	1664	3098

Management Area 22

The Proposed Action consists of manipulation by timber harvest of 1,664 acres designated as critical RCW habitat (MA 22). Timber harvesting proposed in the Proposed Action in MA 22 consists of 1,152 acres of commercial thinning in shortleaf pine stands to a target average BA of 60; 93 acres of commercial thinning in shortleaf pine stands to a target average BA of 60 and 10 BA hardwood; 288 acres of commercial thinning on a 20' spacing; 57 acres of clearcut loblolly pine and regenerate to shortleaf pine; and 74 acres of modified shelterwood to a target average 30 BA. Wildlife stand improvements would occur on 1,245 acres to create an open understory to allow unrestricted flight for RCWs.

BAs of stands proposed for commercial thinning are from Table 3.6 (Revised Forest Plan, pg. 84) that lists thinning guidelines to be used for timber management. The stands to be thinned would be carried beyond the 70 year rotation period making them more susceptible to southern pine beetle infestations. These BAs would reduce the chance that southern pine beetle infestations would spread to adjacent stands. Research has shown that trees spaced at least 20 to 25 feet apart would still get southern pine beetle infestations but the beetles would soon disperse and the spot would not spread. Average diameter of the pine sawtimber to be thinned is 12 to 13 inches. Reducing them down to a target 60 BA would leave at least approximately 20'- 25' between trees. These reduced BAs would eventually reduce the fuel loadings and temporarily create additional early stage habitat needed by various wildlife species.

Where various harvests are proposed there are portions that would not be thinned or harvested because of some type of topographic feature making them unsuitable such as rock outcrops or short steep slopes, or varying widths in riparian zones. The exact acres deducted from these stands would be determined in the field when the timber is marked if the Proposed Action is selected.

A **direct effect** of the Proposed Action in MA 22 shelterwood harvests and the clearcut would create 131 acres of early seral stage habitat (8.2% of the suitable and 6.0% of the overall forested area). A direct effect of the commercial thinning would be a reduced number of trees in the overstory taking the low quality trees and trees that are more susceptible to insect infestations first with the remaining being the best shaped and healthiest trees in the stands.

Management Area 21

The Proposed Action in MA 21 consists of manipulating 1,434 acres by timber harvest. Timber harvesting proposed in the Proposed Action in MA 21 consists of 915 acres of commercial thinning in shortleaf pine stands to a target average BA of 60; 132 acres of commercial thinning in shortleaf pine stands to a target average BA of 60 and 10 BA hardwood; 307 acres of commercial thinning on a 20' spacing; and 80 acres of modified shelterwood to a target average 30 BA. Wildlife stand improvements would occur on 1,047 acres to create an open understory to allow unrestricted flight for RCWs.

BAs of stands proposed for commercial thinning are from Table 3.6 (Revised Forest Plan, pg. 84) that lists thinning guidelines to be used for timber management. The stands to be thinned would be carried beyond the 70 year rotation period making them more susceptible to southern pine beetle infestations. These BAs would reduce the chance that southern pine beetle infestations would spread to adjacent stands. Research has shown that trees spaced at least 20 to 25 feet apart would still get southern pine beetle infestations but the beetles would soon disperse and the spot would not spread. Average diameter of the pine sawtimber to be thinned is 12 to 13 inches. Reducing them down to a target 60 BA would leave at least approximately 20'- 25' between trees. These reduced BAs would eventually reduce the fuel loadings and temporarily create additional early stage habitat needed by various wildlife species.

Where various harvests are proposed there are portions that would not be thinned or harvested because of some type of topographic feature making them unsuitable such as rock outcrops or short steep slopes, or varying widths in riparian zones. The exact acres deducted from these stands would be determined in the field when the timber is marked if the Proposed Action is selected.

A **direct effect** of the Proposed Action in MA 21 modified shelterwood harvests would create 80 acres of early seral stage habitat (5.2% of the suitable and 4.4% of the overall forested area). A direct effect of the commercial thinning would be a reduced number of trees in the overstory taking the low quality trees and trees that are more susceptible to insect infestations first with the remaining being the best shaped and healthiest trees in the stands.

The Ouachita NF Forest Plan calls for designating at least 10% of the suitable acres of each old growth restoration unit as a "core area". The core area is not subject to artificial regeneration. Initially, thinnings and midstory treatment may be necessary to establish pine-grass conditions. Fire is an important component to maintain such conditions (USDA Forest Service, 2005). Stand 1269-28 would be designated as a core area.

Stand 1269-28 is 166 acres and is 10.3% of the suitable acres within MA 21 of the West Haw Creek project.

The remainder of the pine stands within MA 21 of the West Haw Creek project are managed as replacement stands in order to perpetuate old growth conditions and maximize the effective area in old growth at any one time. The replacement stands with extremely old trees are available to take the place of core areas when necessary (USDA Forest Service, 2005).

Management Area 21 and Management Area 22

Mature growth pine and pine hardwood 80 years old or older would be reduced by 154 acres to 1,928 acres but increase to 2,294 acres in 10 years. Mature growth hardwood and hardwood/pine would eventually increase to 577 acres in 10 years. Both would meet and exceed Forest Plan Design Criteria WF006 **“Retain or develop mature growth pine habitats (80 years or greater) and mature growth hardwood habitats (100 years old or greater) at a rate of five percent of each broad cover type within each project analysis area”**.

There would be reduced understory and midstory numbers (hardwood stems) throughout *West Haw Creek* where prescribed burning, harvesting activities, timber stand improvement work, and wildlife stand improvement work would be conducted. The prescribed burning would reduce competing woody vegetation and make some nutrients tied up in the duff layers available for root uptake of remaining overstory, midstory, and understory plants. There would also be an increase of grass and forbs numbers and species composition. Scorch would be visible throughout the area burned. Some needle loss from scorch would occur but as long as the buds are not injured the pine can survive even severe needle loss. Hardwood species most resistant to fire in the project area and most likely to survive are white oaks, post oaks, red oaks, and black oaks. Hickories, red maple, and cedar are less resistant. Hardwood resistance increases with tree diameter due to bark thickness and fire intensity. However some hardwood have the ability to re-sprout, in fact fire increases basal sprouting of hardwood species like the oaks, cherry, red maple, dogwood, blackgum, and basswood. This ability decreases with age and size. Season also can determine the amount of mortality from fire. Growing season burns injure or kill pine and hardwood species, depending on the type of fire and intensity.

The modified shelterwood harvests, commercial thinning, wildlife stand improvements, prescribed burning, and scarification if needed, would create growing conditions favorable to shade intolerant and fire tolerant plant species. The mature *growth* pine component would initially decrease from the proposed modified shelterwood harvests then increase throughout, as the *mature saw timber* component ages into a *mature growth* condition. The mature growth hardwood component would also increase and respond with more hard and soft mast production providing improved habitat for plant and animal species that require it. The understory throughout the project area would show an increased growth response after removing part of the overstory and midstory with the commercial thinning. The overstory would also respond with more vigor making them more resistant to insect and disease infestations.

As an **indirect effect** of removing part of the overstory and midstory, the understory would experience a rapid growth response due to increased sunlight that would improve growing conditions for shortleaf pine, some hardwoods, and many species of non-woody plants. A combination of the proposed actions and continued prescribed burning program would eventually result in the restoration of an old growth conditions in the unsuitable stands and healthy, sustainable timber stands where timber activities are suitable.

Implementing the Proposed Action in the long-term would result in crown closure occurring first in the stands where the pines would be thinned to 60 BA. Crown closure would not affect the established pine saplings in a modified shelterwood condition. The growth response of the mature pine and hardwood would not be as vigorous as in younger stands since many of the trees retained are mature sawtimber trees that have slowed in growth. However, even though the growth response would be less when compared to younger pine and hardwood stands the reduction of the number of trees per acre by harvesting creating more access to sunlight, water, and nutrients would still result in some improved stand vigor and would reduce the chance of disease or insect infestation in the remaining trees. The 601 acres of hardwood and hardwood/pine stands would be managed to maintain and enhance mast-producing hardwoods.

CUMULATIVE EFFECTS

Cumulatively, the overall stand vigor and health of *West Haw Creek* would be improved with the implementation of the Proposed Action. Reduced competition for water, sunlight, and nutrients would create an improved growing environment for the residual pine, and hardwood species including the red oaks and make them more resistant to various disease and insect infestations.

Other cumulative effects of the Proposed Action would be enhanced growth of remaining shade intolerant trees including cone production in shortleaf pine and hard and soft mast production in various shade intolerant hardwood species. The prescribed burning would resemble the natural fire events that helped develop the overstory, midstory, and understory types that probably existed before European settlement. A non-native tree species would be removed and replaced by a native species. An overall cumulative effect would be an increase in diversity of fire tolerant, native, plant species.

Other than the **direct, indirect, and cumulative** impacts mentioned above from the proposed harvest activities, and from past, present committed, or reasonably foreseeable future activities there should not be any adverse effects expected to the various forms of vegetation in this analysis area from these actions nor as an accumulation of impacts from other harvest conducted in adjacent compartments or on private land within this watershed.

Effects of Herbicide Application

Herbicides are proposed for non-native invasive species and to ensure restocking of regeneration stands within *West Haw Creek* with Foliar spray, by injection, or by application to cut stems makes it possible to leave desirable species in groups or individual stems. **Direct effects**, as with a manual treatment, vegetative diversity will not be compromised. By reducing species in general, only actual numbers of species on an area would be affected. **Cumulatively**, the native pine and hardwood species, grasses and forbs would retain their natural distribution throughout the area. The non-native species would be set back or replaced by native species to help establish shortleaf pine in its native habitat only as a last resort.

NO ACTION ALTERNATIVE I

If this alternative is implemented, the existing early seral stage habitat, an ecologically important part of the overall forest health would eventually disappear as a **direct effect**. There would be no open stands or developed wildlife openings, or burning program to provide some type of early seral stage structure needed by various wildlife species. There would be no improvement in stand health because all the conditions that make the pine and red oaks vulnerable now would continue to exist. The understory and midstory would remain dense with fire intolerant species and invader type of species like cedar and red maple that normally do not occupy sites where fire plays a natural role in stand development. Heavy fuel loadings from natural accumulation of fuel buildup would make the *West Haw Creek* project area susceptible to a hot crown killing wildfire.

This alternative does not propose any prescribed burning which would make the *Fourche Mountain* project area susceptible to higher intensity fires, if they should occur, because of the natural accumulations of fuel. An **indirect effect** could lead to an accumulation of ladder fuels, which could increase crown and bole scorch during an unplanned burn. In addition, the increased scorch effect could lead to more natural mortality from insect damage and disease.

In 1995 and 1996, several Southern pine beetle (SPB) spots were detected and treated in *West Haw Creek*. In the summer of 2011 the Ips population began to increase throughout the forest and the district as a result of the extremely dry summer. With the No Action alternative, SPB and Ips infestations would potentially be more frequent and more difficult to control. Critical RCW habitat would not be created or existing habitat would decline.

CUMULATIVE EFFECTS

A **cumulative effect** would be that shade intolerant species such as shortleaf pine, northern and southern red oaks, and black cherry would decline in numbers and eventually be replaced by shade tolerant species like maple, hickory, black gum, and cedar that are already in the understory and midstory. This is currently happening where red oak decline is present on some of the ridge tops. Some red oaks on these ridges are dying from a combination of drought, hypoxylon canker,

overstocking, low site indexes, and various borers. There would be some mature growth pine and hardwood scattered in pockets throughout the area growing under stressed conditions. Lack of water and nutrients caused by overcrowding in the overstory, midstory, and understory would contribute to individual trees inability to withstand any insect or disease infestations that develop. Native grasses and other shade intolerant species would decline and be replaced by invader type species such as cedar and red maple. Growth in existing young pine stands would slow, eventually reducing tree vigor, quality, and stocking in favor of more shade intolerant species. Non-native loblolly would continue to grow and seed in adjacent areas. Fuel load accumulations from natural events would increase leaving many larger branches and tree boles on the ground. This creates a situation where any wildfire could potentially become a hard to control, crown killing fire. A wildfire occurring in this fuel type can cause erratic fire behavior with spotting potential. Fires of this intensity have the potential to damage forest resources and endanger the life and property of firefighters and the public.

NO HERBICIDE ALTERNATIVE II

The effects would be the same as the Proposed Action. The only difference between the Proposed Action and Alternative II is herbicide use is not proposed in this alternative.

CUMULATIVE EFFECTS

Without the use of herbicides, several manual methods would be required to control the non-native, off-site species. These species would continue to send up sprouts until the reserves stored in the root system could no longer sustain the plant.

NO ROAD CONSTRUCTION ALTERNATIVE III

The effects of this alternative would be the same as the Proposed Action except for those associated with fewer harvest acres and connected action acres. Modified shelterwood harvests would create 74 acres of early seral stage habitat (4.4% of the suitable acres). Commercial thinning would reduce the number of trees in the overstory taking the low quality trees and trees that are more susceptible to insect infestations first with the remaining being the best shaped and healthiest trees in the stands.

Mature growth pine and pine hardwood 80 years old or older would be reduced by 74 acres to 2,008 acres but increase to 2,374 acres by the next entry. Mature growth hardwood and hardwood/pine would eventually increase to 577 acres in 10 years. Both would meet and exceed Forest Plan Design Criteria WF006 **“Retain or develop mature growth pine habitats (80 years or greater) and mature growth hardwood habitats (100 years old or greater) at a rate of five percent of each broad cover type within each project analysis area”**.

WILDLIFE, HABITAT, AND FISHERIES

Present Conditions

West Haw Creek Mountain Ecological Management Unit totals 4,149 acres of National Forest land.

- This EMU is influenced by private land that is centrally located in this EMU.
- There are currently no active Red-cockaded woodpecker (RCW) clusters in this EMU
- There are currently 10 acres in the 0-10 year-old age class on National Forest land in this project area making this EMU poor habitat for early seral stage species such as Prairie warblers and Northern bobwhites.
- Many mature forest stands have a dense midstory that limits grasses and non-woody understory.
- Prescribed burning has been irregular allowing wildlife habitat conditions to deteriorate within this EMU.
- Open road density is 1.50 miles per square mile in this project area at this time which exceeds the desired.

The project area is allocated to Management Area 22 (Shortleaf pine/blue stem grass/RCW) and Management Area 21 (Old Growth Restoration).

These existing conditions concerning wildlife, fish and T&E species and their habitats, just to name a few, were considered when developing the Proposed Action for this project area.

There are 33 existing ponds. The Forest Plan calls for at least 26 water sources in the project area. Existing ponds will need to be rehabilitated to sustain reliable water sources. No additional ponds need to be constructed to meet the forest plan objective of one water source per 160 acres. There is not an adequate amount of nest structures. The existing nest boxes have rotted and need to be replaced. Midstory is too thick to allow development of grasses and forbs. Hardwood crowns are not developed to produce an adequate hard mast crop.

Revised Forest Plan (RFP) Design Criteria WF001: *On a project-by-project basis, provide grass-forb or shrub-seedling habitats (include regeneration areas 0-10 years in age, areas of recent heavy storm or insect damage, and woodland conditions) at a rate of:*

- *A minimum of 4 percent of the suitable acres in MA 22, Shortleaf Pine/Bluestem /RCW*
- *A minimum of 3 percent of the suitable acres in MA 21, Old Growth Restoration*

To meet Design Criteria WF001 *West Haw Creek* needs 116 acres of early seral stage habit. There is currently 10 acres of early seral stage habitat in *West Haw Creek*. An additional 106 will need to be created to meet these criteria. This is figured by the following equations:

- For MA21: $1,634 \text{ suitable} \times 0.03 = 49 \text{ acres.}$
- For MA22: $1665 \text{ suitable} \times 0.04 = 67 \text{ acres.}$

RFP Design Criteria WF002: *Limit even-age regeneration cutting in each project area to no more than 14 percent of the suitable acres managed under even-aged prescriptions, per 10-year entry except for the following:*

- *A maximum of 8.3 percent of the suitable acres in MA 22, Shortleaf Pine/Bluestem /RCW*
- *A maximum of 6 percent of the suitable acres in MA 21, Old Growth Restoration*

In *West Haw Creek*, no more than 226 acres of 0-10 age-class can be created by this Proposed Action. This is figured by the following equations (minus the 10 acres of existing):

- For MA21: $1,634 \text{ suitable} \times 0.06 = 98 \text{ acres to create.}$
- For MA22: $1,665 \text{ suitable} \times 0.083 = 138 \text{ acres to create.}$

The Proposed Action would meet these criteria (Design Criteria WF001 and WF002). Management Area 21.

Regeneration harvests in MA 21 (80 ac. shelterwood) plus 5 acres of existing would increase the 0-10 year age class to 85 acres (5.2% of the suitable land class) in order to meet Management Area 21 goals. Regeneration harvests in MA 22 (74 ac. shelterwood and 57 acres of clearcut) plus the existing 5 acres would increase the 0-10 year age class to 136 acres (8.2% of the suitable land class) in order to meet Management Area 22 goals.

RFP Design Criteria WF003: *Provide for and designate areas for mast production at the approximate rate of 20 percent of each project area. Hardwood and hardwood-pine forest types, age 50 and older, comprise this component.*

The hardwood component, which is over 50 years old, is currently about 14.4% (597 acres) of the total forested land. This project area does not currently meet this Revised Forest Plan Design Criteria.

RFP Design Criteria WF006: *Retain or develop mature growth pine habitats (80 years old or greater) and mature growth hardwood habitats (100 years old or greater) at a rate of five percent of each broad cover type within each project analysis area.*

For *West Haw Creek*, this would be at least 177 acres (5 % of 3,548 acres) of mature growth pine and 30 acres (5% of 601 acres) of mature growth hardwood. There are currently 27 acres (4.5%) of mature growth hardwood stands 100 years old or older within this project area. There are also 2,449 acres (63%) of pine considered mature growth pine 80 years old or older.

RFP Design Criteria WF09: *Provide nest structures where suitable natural cavities do not occur and needed to accomplish wildlife objectives.*

Many snags and cavity trees were created in this area by past ice storms. This was a positive condition for many cavity dependent species. However, cavity trees are still limited in some areas.

RFP Design Criteria WF012: *Where possible, seasonally close roads during critical periods for wildlife (March–August).*

Currently the open road density for *West Haw Creek* is 1.50 miles per square mile.

RFP Design Criteria WF010: *Where there is no existing water source, provide at least one wildlife pond per 160 acres where needed to accomplish wildlife objectives.*

Currently, *West Haw Creek* contains several waterholes. The existing wildlife ponds (33) need to be reconstructed. Reconstruction is necessary to make the existing waterholes reliable as year-round water sources. No additional water sources are needed to meet RFP design criteria WF010.

EFFECTS OF MANAGEMENT ACTIVITIES ON WILDLIFE

PROPOSED ACTION AND ALTERNATIVE II

The RFP Design Criteria was used to develop the Proposed Action and Alternative II for *West Haw Creek*. These criteria are in place to protect and expand populations of endangered species and maintain viable populations of all native wildlife species on the forest. Actions proposed in this environmental assessment would begin with a timber sale (and associated road work) that could not be sold until late 2016 or later. This sale(s) would probably take 3-5 years to log all stands treated by timber harvest. Other activities would occur after the timber sale is completed.

Road work would include pre-haul maintenance of 9.05 miles, reconstruction of 2.0 miles of existing roads, 1.0 mile new construction, creating temporary roads (14 miles), and log decks within stands to be thinned or regenerated. Reconstruction/maintenance includes brushing back right-of-ways, replacing rusted out culverts, and adding surface gravel where necessary along the timber sale haul routes. Road reconstruction would decrease the possibility of increased erosion and sedimentation in the local streams. Road obliteration of 9.95 miles will also be completed after the timber sale is completed.

RFP Design Criteria WF012: The Proposed Action and Alternative II would lower the open road density the same to 1.03 miles per square mile. Temporary roads and log decks are seeded after they are no longer utilized. These temporary roads

and log decks along with firelines would then become temporary wildlife openings. The objective of an opening is to provide a supplemental food source to sustain wildlife populations in areas of poor habitat, or to supplement food shortages on a seasonal or temporary basis. These openings also provide nesting and brood habitat for game and non-game birds.

Wildlife stand improvement (midstory) of 2,291 acres of pine stands would further open these stands to allow sunlight to the forest floor and encourage grasses and forbs in the understory. These more open stands would improve flight paths for the endangered RCW as well as for other wildlife species. Remaining hardwoods would have more room and less competition and be able to develop healthier crowns and thus increase in mast production. The WSI would also encourage re-sprouting of many oaks and other hardwoods. These re-sprouts would be used as browse by various wildlife species such as white-tailed deer.

Wildlife pond reconstruction (33) would provide year-round permanent water sources, which would be utilized by many wildlife species. These wildlife ponds would not be stocked and would provide locations for increased amphibian reproduction. RFP Design Criteria WF010 (*water developments*) will be met by the Proposed Action or Alternative II.

Nest box placement would provide cavities for species such as wood ducks and many bat species at waterhole locations and bluebirds in regeneration areas. Many snags and cavity trees were created in this area by past ice storms. This was a positive condition for many cavity dependent species. However, some areas still need additional nesting habitat. Placing nest structures at ponds and in regeneration areas will help meet this criterion.

Timber Harvest, particularly even-age regeneration cuts, is often referred to by the public as deforestation. This is not the case. The forested area stays forested but becomes a different age with differing vertical structure. These harvest cuts mimic natural occurrences such as wind storms or wild fire. Deforestation occurs when forested land is cleared and then used for other uses such as housing developments.

Regeneration cutting (modified shelterwood of 154 acres shortleaf pine and 57 acres of loblolly clearcutting) would produce enough early seral stage habitats to have appropriate habitat capability for viable populations of many early seral stage species and not exceed standards that protects sustainability of the forest. Both RFP Design Criteria WF001 and WF002 are met by the Proposed Action and Alternative II.

Reforestation treatments (even-age/shelterwood and clearcut harvested stands) would occur on 211 acres of new regeneration units. This would consist of utilizing hand tools and mechanical scarification. The intent of mechanical scarification is to disturb the duff layer and expose as minimum amount of soil as possible with 8 ft. spacing on contour throughout the seed tree stands. These treatments would create early seral stage habitat such as grasses, forbs, and woody re-sprouts for wildlife use.

In the Proposed Action only, herbicide application would be used, if needed, as a last resort for restocking and for non-native invasive species. The herbicide of choice would employ glyphosate as an active ingredient and triclopyr. The herbicides would have no detrimental effect on wildlife (Syracuse Environmental Research Associates (SERA) for Glyphosate, Triclopyr, and Imazapyr 2011).

Commercial thinning would occur on 2,291 acres of pine forest to achieve basal areas of 60-70 square feet of pine per acre and 596 acres of commercial thinning on 20-foot spacing. This would develop the crowns of existing hardwoods and remaining pines in these pine stands. Thinning would increase sunlight to the forest floor, increase the understory species, and further develop hard and soft mast capabilities for this project area.

RFP Design Criteria WF003 (*Provide for and designate areas for mast production at the approximate rate of 20 percent of each project area*). *West Haw Creek* EMU does not currently meet this RFP Design Criteria. Only about 14.4% (597 acres) of *West Haw Creek* can be considered suitable for mast production. All hardwood stands except for 4 acres within *West Haw Creek* are of suitable mast producing age. Therefore, this EMU falls short of meeting the 20% mark and will not meet it in the foreseeable future. The converting of pine forest type stands to hardwood forest type stands for the purpose of meeting these criteria is not an option in this EMU because it would be detrimental to the endangered Red-cockaded woodpecker which is one of the primary focuses of this management area. When looking at mast production at a forest-

wide scale the shortfall of this EMU will be offset by other EMUs that are primarily hardwood forest types. The Proposed Action, Alternative II or Alternative III does not negatively alter this design criterion for this EMU.

RFP Design Criteria WF006 (*Retain or develop mature growth...*) *West Haw Creek* currently far exceeds this criteria for pine with over 63% of the pine stands currently in a mature growth condition. The project area is close to meeting this criterion for hardwood with 4.5% of the hardwood stands currently in a mature growth condition. In time this criterion will be met for hardwoods stands as well. The Proposed Action or Alternative II does not negatively alter this design criterion for this EMU.

Prescribed burning totaling 4,149 acres would first occur after timber harvest is completed in *West Haw Creek*. Multiple objectives would be met by prescribed burning such as wildlife habitat improvement, control understory, and fuel reduction. These burns (every 3-5 years) could top-kill some hardwoods if they are less than 2" at collar height but re-sprouting of these hardwood stems would occur. While some cover would be lost in a prescribed burn, there would be an increase in grasses and forbs and this type of cover would replace what may be lost in a short time. This activity would increase the amount and palatability of browse utilized by various wildlife species such as white-tailed deer.

Timber stand improvements (248 ac.) [*some of these are repeated acres*] in the Proposed Action and Alternative II would open these stands for more use by early seral stage wildlife species. The dense conditions now present that do not allow for much understory vegetation in these stands would be reduced. The re-sprouting of hardwoods after the hand tool treatments would also produce new browse utilized by various wildlife species such as white-tailed deer.

NO ROAD CONSTRUCTION ALTERNATIVE III

Road work would include pre-haul maintenance of 7.59 miles, reconstruction of 2.0 miles of existing roads, no system road construction, no temporary road construction, and log decks within stands to be thinned or regenerated. Reconstruction/maintenance includes brushing back right-of-ways, replacing rusted-out culverts, and adding surface gravel where necessary along the timber sale haul routes. Road reconstruction would decrease the possibility of increased erosion and sedimentation in the local streams. Road obliteration of 9.95 miles would also be completed after the timber sale is completed. No new road construction (system or temporary) is proposed in this project area.

RFP Design Criteria WF012: This alternative would lower the open road density to 1.03 miles per square mile. Log decks would be seeded after they are no longer utilized. These log decks, as well as firelines, would then become temporary wildlife openings. The objective of an opening is to provide a supplemental food source to sustain wildlife populations in areas of poor habitat, or to supplement food shortages on a seasonal or temporary basis. These openings also provide nesting and brood habitat for game and non-game birds.

Wildlife stand improvement (midstory reduction) of 738 acres of pine stands would further open these stands to allow sunlight to the forest floor and encourage grass/forb development in the understory. Remaining hardwoods would have more space and less competition, so would be able to develop healthier crowns- thus increasing mast production. The WSI would also encourage re-sprouting of many oaks and other hardwoods. These re-sprouts could be used as browse by various wildlife species such as white-tailed deer.

Wildlife waterhole reconstruction (26) would provide year around, permanent water sources, which could be utilized by many wildlife species. Depending upon site specific suitability, these woodland ponds may or may not be stocked with native species of fish. Those not suitable for fish stocking would provide secure and suitable habitats for increased amphibian reproduction. RFP Design Criteria WF010 (*water developments*) the no Road Construction Alternative III would allow *West Haw Creek* to continue meeting the Forest Plan criteria of 1 waterhole per 160 acres by reconstructing 25 of the 33 existing waterholes in the project area. However, not reconstructing 8 of the existing waterholes would eventually lead to the waterhole filling in or becoming dry resulting in this EMU not meeting this design criteria.

Nest box placement would provide supplemental cavities for species such as wood ducks and many bat species at waterhole locations, and bluebirds in regeneration areas. Many snags and cavity trees were created in this area by past ice

storms. This was a positive condition for many cavity dependent species. However, some areas still need additional nesting habitat. Placing nest structures at ponds and in regeneration areas will help meet this need.

Timber harvest, particularly even-age regeneration cutting, is often referred to by the public as deforestation. This is not the case in the project area. In *West Haw* EMU the forested area stays forested, but becomes a different age with differing vertical and horizontal structure. The harvest cuts mimic natural occurrences such as wind storms or stand replacement wildfires. True deforestation occurs when forested land is permanently cleared and then used for other non-forest uses such as housing developments.

Regeneration cutting (modified shelterwood of 74 acres of shortleaf pine and clearcut of 57 acres of loblolly pine) would produce enough early seral stage habitat to meet habitat capability requirements for viable populations of species dependent upon that habitat type, while not exceeding standards which protect sustainability of other wildlife and plant species in the forest. Both RFP Design Criteria WF001 and WF002 are met by this alternative.

Reforestation treatments (even-age/shelterwood harvested stands) would occur on 131 acres of new regeneration units. These treatments would be accomplished utilizing hand tools and mechanical scarification. The intent of mechanical scarification is to disturb the duff layer while exposing the minimum amount of soil needed and achieving an 8 ft. seedling spacing on contour throughout the seed tree stands. These treatments would create early seral stage habitat such as grasses, forbs, and woody re-sprouts for wildlife use.

Herbicide application would be used, if needed, as a last resort for restocking and for non-native invasive species. The herbicide of choice would employ glyphosate as an active ingredient and triclopyr. The herbicides would have no detrimental effect on wildlife (Syracuse Environmental Research Associates (SERA) for Glyphosate, Triclopyr, and Imazapyr 2011).

Commercial thinning would occur on 738 acres of pine forest to achieve basal areas of 60 square feet of pine per acre, and commercial thinning on 20-foot spacing would occur on 137 acres. This would develop the crowns of existing hardwoods and remaining pines in these pine stands. Thinning would increase sunlight to the forest floor, increase the understory species, and further develop hard and soft mast capabilities for this project area.

RFP Design Criteria WF003 (*Provide for and designate areas for mast production at the approximate rate of 20 percent of each project area*). *West Haw Creek* EMU does not currently meet this RFP Design Criteria. Only about 14.4% (597 acres) of *West Haw Creek* can be considered suitable for mast production. All hardwood stands except for 4 acres within *West Haw Creek* are of suitable mast producing age. Therefore, this EMU falls short of meeting the 20% mark and will not meet it in the foreseeable future. The converting of pine forest type stands to hardwood forest type stands for the purpose of meeting these criteria is not an option in this EMU because it would be detrimental to the endangered Red-cockaded woodpecker which is one of the primary focuses of this management area. When looking at mast production at a forest-wide scale the shortfall of this EMU will be offset by other EMUs that are primarily hardwood forest types. This alternative does not negatively alter this design criterion for this EMU.

RFP Design Criteria WF006 (*Retain or develop mature growth...*) *West Haw Creek* currently far exceeds this criteria for pine with over 63% of the pine stands currently in a mature growth condition. The project area is close to meeting this criterion for hardwood with 4.5% of the hardwood stands currently in a mature growth condition. In time this criterion will be met for hardwoods stands as well. This alternative does not negatively alter this design criterion for this EMU.

Prescribed burning totaling 4,419 acres would first occur after timber harvest is completed in *West Haw*. Multiple objectives, such as wildlife habitat improvement, control of understory plant species, and fuel reduction, would be met by prescribed burning. These burns (every 3-5 years) could top-kill some hardwoods if they are less than 2" at the root collar, but re-sprouting of these hardwood stems would occur. While some ground cover would be temporarily reduced with a prescribed burn, there would be an overall increase in grasses and forbs, and this type of herbaceous cover would quickly replace what vegetative cover may have been initially lost. In the long term prescribed burning will increase the amount and palatability of browse utilized by various wildlife species such as white-tailed deer.

Timber stand improvements (168 ac.) *[some of these are repeated acres]* would open these stands for more use by early seral stage wildlife species. The dense vegetative conditions now present that do not allow for ground story vegetation development in these stands would be reduced. The re-sprouting of hardwoods after the hand tool treatments would also produce new browse utilized by various wildlife species such as white-tailed deer.

NO ACTION ALTERNATIVE I (Deferred Management Activities)

The effects of selecting the No Action alternative for West Haw Creek are many. Directly, the forest stands would continue to age and mature. Leaf litter would continue to build on the forest floor in mature and maturing stands of pine and hardwoods. Understory plant species would begin to decline in species variety and overall numbers. Early seral stage type habitat and browse would continue to disappear. Open-road density would remain at its current level. Some waterholes would continue to dry up during seasons of drought. Thick existing plantations would continue to be dense and inaccessible to many wildlife species. Indirectly, species of wildlife requiring open areas such as Northern bobwhite, Bachman's sparrow, and Eastern bluebird and species requiring a mosaic of forest age classes such as deer, wild turkey, and black bear would move out of the area. Timber stands currently suitable for RCW nesting and foraging would deteriorate due to increases in overstory and midstory density. No other activities are known for this project area. There would be no cumulative effects.

EFFECTS ON MANAGEMENT INDICATOR SPECIES (MIS)

The Forest Service Manual (FSM) defines MIS as "any species, or group of species, or species habitat element selected to focus management attention for the purpose of resource production, population recovery, maintenance of population viability, or ecosystem diversity"

Land managers are directed to select management indicators for a Forest Plan or project that best represent the issues, concerns, and opportunities to support recovery of Federally-listed species, provide continued viability of sensitive species, and enhance management of wildlife and fish for commercial, recreational, scientific, subsistence, or aesthetic values or uses. "Management indicators representing overall objectives for wildlife, fish, and plants may include species, groups of species with similar habitat relationships, or habitats that are of high concern".

This current list of MIS (with associated purpose or habitat categories) is shown in the table below.

Management Indicator Species (MIS) and Associated Purposes

Life form	Scientific name	Common name	Selected for this project? (YES/NO)
DEMAND SPECIES			
Bird	<i>Colinus virginianus</i>	Northern Bobwhite	YES
Bird	<i>Meleagris gallopavo</i>	Eastern wild turkey	YES
Fish	<i>Micropterus dolomieu</i>	Smallmouth bass	YES
Mammal	<i>Odocoileus virginianus</i>	White-tailed deer	YES
VIABILITY CONCERN SPECIES – ADDRESSED IN T&E SECTION OF THIS EA			
Bird	<i>Picoides borealis</i>	Red-cockaded woodpecker	YES
ADEQUATE EARLY FOREST STAGE COVER			
Bird	<i>Colinus virginianus</i>	Northern Bobwhite	YES
Bird	<i>Dendroica discolor</i>	Prairie warbler	YES
ADEQUATE MATURE PINE FOREST COVER			
Bird	<i>Dryocopus pileatus</i>	Pileated woodpecker	YES
Bird	<i>Picoides borealis</i>	Red-cockaded woodpecker (MA 22)	YES
Bird	<i>Piranga olivacea</i>	Scarlet tanager	YES
ADEQUATE MATURE HARDWOOD FOREST COVER			
Bird	<i>Dryocopus pileatus</i>	Pileated woodpecker	YES
Bird	<i>Piranga olivacea</i>	Scarlet tanager	YES
RECREATIONAL FISHING QUALITY (LAKES AND PONDS)			
Fish	<i>Lepomis macrochirus</i>	Bluegill	NO
Fish	<i>Lepomis microlophus</i>	Redear sunfish	NO
Fish	<i>Micropterus salmoides</i>	Largemouth bass	NO
HABITAT QUALITY OF STREAMS: ARKANSAS RIVER VALLEY HABITAT CATEGORY			
Fish	<i>Ameiurus natalis</i>	Yellow bullhead	YES
Fish	<i>Camptostoma anomalum</i>	Central stoneroller	YES
Fish	<i>Etheostoma whipplei</i>	Redfin darter	YES
Fish	<i>Lepomis cyanellus</i>	Green sunfish	YES
Fish	<i>Lepomis megalotis</i>	Longear sunfish	YES
HABITAT QUALITY OF STREAMS: GULF COASTAL PLAIN -- HABITAT CATEGORY NOT IN WEST HAW CREEK			
Fish	<i>Aphredoderus sayanus</i>	Pirate perch	NO
Fish	<i>Camptostoma anomalum</i>	Central stoneroller	NO
Fish	<i>Erimyzon oblongus</i>	Creek chubsucker	NO
Fish	<i>Lepomis cyanellus</i>	Green sunfish	NO
Fish	<i>Lepomis megalotis</i>	Longear sunfish	NO
HABITAT QUALITY OF STREAMS: OUACHITA MOUNTAINS -- HABITAT CATEGORY NOT IN WEST HAW CREEK			
Fish	<i>Camptostoma anomalum</i>	Central stoneroller	NO
Fish	<i>Etheostoma nigrum</i>	Johnny darter (w/in leopard darter range only)	NO
Fish	<i>Etheostoma radiosum</i>	Orangebelly darter	NO
Fish	<i>Etheostoma whipplei</i>	Redfin darter	NO
Fish	<i>Fundulus catenatus</i>	Northern studfish	NO
Fish	<i>Hypentelium nigricans</i>	Northern hog sucker	NO
Fish	<i>Lepomis cyanellus</i>	Green sunfish	NO
Fish	<i>Lepomis megalotis</i>	Longear sunfish	NO
Fish	<i>Luxilus chrysocephalus</i>	Striped shiner	NO
Fish	<i>Micropterus dolomieu</i>	Smallmouth bass	NO
Fish	<i>Percina copelandi</i>	Channel darter (w/in leopard darter range only)	NO

Note that several MIS appear under more than one habitat or purpose category.

MIS selected for this project - The Ouachita National Forest MIS list was reviewed and a subset of categories and associated MIS was selected for this project. The right column in the table above indicates which MIS were selected for this project. The following MIS categories and their associated MIS were eliminated from further consideration because they do not occur on National Forest land in this project area: Habitat Quality of Streams (Gulf Coastal Plain, Ouachita Mountains) and Recreational Fishing Quality (Lakes and Ponds). The remaining categories are represented in the project area and summarized in the table below.

Management Indicator Species (MIS)

	COMMON NAME	PURPOSE OF SELECTION
1.	Bobwhite quail	Demand Species and Adequate Early Forest Stage Cover
2.	Eastern wild turkey	Demand Species
3.	White-tailed deer	Demand Species
4.	Prairie warbler	Adequate Early Forest Stage Cover
5.	Pileated woodpecker	Adequate Mature Pine Forest Cover /Adequate Mature Hardwood Forest Cover
6.	Scarlet tanager	Adequate Mature Pine Forest Cover /Adequate Mature Hardwood Forest Cover
7.	Red-cockaded woodpecker	Adequate Mature Pine Forest Cover /Viability Concern Species– addressed in T&E section of this EA
8.	Habitat Quality of Streams: Arkansas River Valley	
8a.	Yellow bullhead	<i>HABITAT QUALITY OF STREAMS: ARKANSAS RIVER VALLEY</i>
8b.	Central stoneroller	<i>HABITAT QUALITY OF STREAMS: ARKANSAS RIVER VALLEY</i>
8c.	Redfin darter	<i>HABITAT QUALITY OF STREAMS: ARKANSAS RIVER VALLEY</i>
8d.	Green sunfish	<i>HABITAT QUALITY OF STREAMS: ARKANSAS RIVER VALLEY</i>
8e.	Longear sunfish	<i>HABITAT QUALITY OF STREAMS: ARKANSAS RIVER VALLEY</i>
9.	Small mouth Bass	<i>DEMAND SPECIES</i>

Effects on project MIS - Six terrestrial animal MIS (1-6 above) were modeled to compare habitat capabilities within the project area for the No Action alternative and the Proposed Action/Alternative II (table above). It should be noted that this model assumes that all treatments occur within the same year (when, in fact, treatments may occur over the course of the 10 year planning period; therefore, actual habitat capability would differ from the projections presented here). Response of Selected MIS to Alternative by Decade of Implementation (Habitat Capability Model – numbers are rounded to closest whole number)

	MANAGEMENT INDICATOR SPECIES (MIS)					
	QUAIL (1)	TURKEY (2)	DEER (3)	PRAIRIE WARBLER (4)	PILEATED WOODPECKER (5)	SCARLET TANAGER (6)
	INDIVIDUALS PER SQUARE MILE					
NO ACTION						
Baseline	12.66	5.50	12.74	1.56	30.91	28.54
After 10 Years	11.89	5.33	12.86	0.32	33.24	30.22
PROPOSED ACTION & ALTERNATIVE II						
After Initial treatments	124.66	11.48	39.00	171.94	14.64	26.95
After 10 Years	27.51	5.20	16.86	14.09	32.00	29.87
NO ROAD CONSTRUCTION ALTERNATIVE III						
After Initial treatments	83.04	9.76	29.22	128.55	16.83	24.81
After 10 Years	21.59	5.26	15.38	8.87	32.60	30.04

Model coefficients are not available for the other MIS (7 -9), which were selected for this project, but direct, indirect, and cumulative effects on their populations are discussed below.

PROPOSED ACTION AND ALTERNATIVE II

The Proposed Action would produce 211 acres of early seral stage habitat through tree harvesting and site preparation activities. Under the Proposed Action and Alternative II, habitat availability for each terrestrial vertebrate MIS would be sufficient to achieve all of the minimum population objectives and, in several cases, meet or exceed the optimum levels.

Quail: Habitat availability and population trend for quail, a Demand Species that also represents Adequate Early Forest Stage Cover, would increase over 9-fold after initial treatments of timber harvest, TSI, WSI, and prescribed burning. Directly, some nest could be disturbed by logging equipment if done during nesting season. Indirectly, the Proposed Action and

Alternative II would produce more preferred habitat of the quail by producing enhanced nesting cover, an abundance of food, and reliable water sources. These activities should support a positive population trend.

Deer and Turkey: Two MIS species representing Demand Species, deer and turkey, would generally both fair better under the Proposed Action or Alternative II than under No Action. There would be no direct affect to deer but some turkey nest could be disturbed if activities occur during nesting season. Indirectly, the habitat that both species prefer would be improved by action. Indirectly, both species would benefit from the overall effects of the Proposed Action or Alternative II by the enhancement of food, cover and water availability.

Prairie Warbler: Prairie Warbler is an MIS for Adequate Early Forest Stage Cover. Its requirements can be met by forest stands under the age of 20 and by prescribed burning in open pine stands. Treatments in the Proposed Action and Alternative II lead to impressive population levels following treatments. There would be no appreciable direct affect to the prairie warbler though some nest disturbance could occur. Indirectly, with the implementation of an action alternative, more of the preferred habitat of the prairie warbler would be produced enhancing nesting cover and the abundance of food and water available, supporting a positive population trend.

Pileated Woodpecker and Scarlet Tanager: For these MIS representing mature forest types, habitat capabilities are projected to be slightly lowered by the proposed treatments. The amount of Adequate Mature Forest Cover exceeds the optimum needs for Pileated Woodpecker and Scarlet Tanager for both pine and Hardwood. There would be no direct, indirect or cumulative affects by the proposed activities.

This Proposed Action or Alternative II would perpetuate habitat capabilities for each of the selected terrestrial vertebrate MIS. The Proposed Action and Alternative II meet most of the wildlife associated Revised Forest Plan (2005) Design Criteria mentioned above in this wildlife section with the exception of WF003 and WF006. The Proposed Action or Alternative II does not negatively alter RFP Design criteria WF003 or WF006. When looking at mast production at a forest wide scale the shortfall of this EMU will be offset by other EMUs that are primarily hardwood forest types. WF006 will be met in approximately 2 years as hardwood stands are allowed to age.

Habitat Quality of Streams: Arkansas River Valley MIS (MIS species 8a.–8e.) and Small Mouth Bass: The Proposed Action, Alternative II and the No Action alternative would have no appreciable direct, indirect, or cumulative effects on stream habitats and the associated aquatic MIS. All streams would be protected from the direct effects of logging, wildlife habitat improvement activities, and prescribed burning. Cumulatively, the proposed action would have no effect on stream habitats in *West Haw Creek* or the stream-associated MIS. This project would have no effect on Forest-wide trends of these MIS.

NO ROAD CONSTRUCTION ALTERNATIVE III

The No Road Construction Alternative would produce 131 acres of early seral stage habitat through tree harvesting and site preparation activities. Under this alternative, habitat availability for each terrestrial vertebrate MIS would be sufficient to achieve all of the minimum population objectives, and in several cases meet or exceed the optimum levels.

Quail: Habitat availability and population trend for quail, a Demand Species that also represents Adequate Early Forest Stage Cover, would increase over 6-fold after initial treatments of timber harvest, TSI, WSI, and prescribed burning. Directly, some nests could be disturbed by logging equipment, if treatments are performed during nesting season. Indirectly, the No Road Construction Alternative III would produce more preferred habitat than the no action alternative for quail by producing enhanced nesting cover, an abundance of food, and reliable water sources. These activities should result in a positive population trend. However, the No Road Construction Alternative III would not produce as much habitat as the Proposed Action or Alternative 2.

Deer and Turkeys: Two MIS species representing Demand Species, deer and turkeys, would generally both fare better under the No Road Construction Alternative III than under the No Action alternative. There would be no direct effect on deer, but some turkey nests could be disturbed if cultural treatments occur during nesting season. Indirectly, the habitat that both of these species prefer would be improved by an action alternative. Indirectly, both species would benefit from

the overall effects of the No Road Construction Alternative III by the enhancement of food, cover, and water availability but to a lesser degree than the purposed action.

Prairie Warbler: Prairie Warbler is an MIS for Adequate Early Forest Stage Cover. Its requirements can be met by forest stands under the age of 20 and by prescribed burning in open pine stands. Treatments in the Proposed Action and Alternative II lead to impressive population levels following treatments. There would be no appreciable direct effect on the prairie warbler population, though some nest disturbance could occur. Indirectly, the implementation of the No Road Construction Alternative III would undoubtedly enhance nesting cover, increases the availability and abundance of food and water, resulting in more preferred prairie warbler habitat than the no action alternative. However, when compared to the purposed action and alternative II the habitat capability of the No Road Construction Alternative III would be less for this species. All action alternatives would result in a positive population trend for the Prairie Warbler.

Pileated Woodpecker and Scarlet Tanager: For these MIS representing mature forest types, habitat capabilities are projected to be lowered slightly by all action alternatives. The amount of Adequate Mature Forest Cover exceeds the optimum needs for Pileated Woodpecker and Scarlet Tanager for both pine and hardwood. There would be no appreciable direct effect on the populations of these species, though some nest disturbance could occur. Indirectly, Ideal habitat will be reduced due to mature forest being regenerated. No cumulative effects are anticipated for these species with the implementation of the No Road Construction Alternative III.

The No Road Construction Alternative III would perpetuate habitat capabilities for each of the selected terrestrial vertebrate MIS. The No Road Construction Alternative III meets most of the wildlife associated Revised Forest Plan (2005) Design Criteria mentioned above in this wildlife section- with the exception of WF003, and WF006. The No Road Construction Alternative III does not negatively alter RFP Design criteria WF003. When looking at mast production on a forest-wide scale, the shortfall of this EMU will be offset by other EMUs that are primarily hardwood forest types. Like WF003 the No Road Construction Alternative III does not negatively alter RFP Design criteria WF006. The project area exceeds the criterion for Pine and is close to meeting this criterion for hardwood with 4.5% of the hardwood stands currently in a mature growth condition. In time this criterion will be met for hardwoods stands as well.

Habitat Quality of Streams: Arkansas River Valley MIS (MIS species 8a.-8e.) and Small Mouth Bass: This alternative would have no appreciable direct, indirect, or cumulative effects on stream habitats and the associated aquatic MIS. All streams would be protected from the direct effects of logging, wildlife habitat improvement activities, and prescribed burning. Cumulatively, this alternative would have no effect on stream habitats in *West Haw Creek* or on stream-associated MIS. This alternative would have no effect on forest-wide trends of these MIS.

NO ACTION ALTERNATIVE

Quail and Prairie Warbler: The No Action Alternative would have no direct effect on these species and produce no new early seral stage habitat (MIS category: Adequate Early Forest Stage Cover). It would result in not meeting the minimum amount of early seral stage conditions in this project area. Habitat availability for prairie warblers would become insufficient to meet the projected minimum available habitat in this area through time. Cumulatively, this alternative would perpetuate conditions that keep quail and Prairie Warbler numbers low in the Forest.

Pileated Woodpecker, Turkey, Scarlet Tanager and White-tailed Deer: There would be no direct effect on these species. Habitat availability for the other terrestrial vertebrate MIS would change little over the first 10 years (indirect and cumulative effect). The No Action Alternative meets forest plan objectives for adequate mature forest cover for pine and hardwood forest types (same as the Proposed Action and Alternative II). Forest plan objectives will also be met for two of the three MIS representing Demand Species (deer and turkey but not quail). Forest plan objective for quail will not be met by the no action alternative due to no earl seral habitat existing in the EMU or being created.

Stream Habitats and Associated MIS: The No Action Alternative would have no appreciable direct or indirect effects on stream habitats or the associated MIS (Habitat Quality of Streams: Arkansas River Valley) due to the lack of active management. These are species (8a.-8e and 9.), as listed in the **Management Indicator Species (MIS)**.

EFFECTS ON MIS IN THE CONTEXT OF FOREST-WIDE TRENDS (USDA FOREST SERVICE, SEPTEMBER 2011)

The Bobwhite quail has experienced population declines across Arkansas due to decreases in early seral stage habitat. Bobwhite quail Breeding Bird Census data indicates a decreasing quail population since 1997 while estimated habitat capability for the Northern Bobwhite shows a modest increase since FY 2006. However, habitat capability is still far from reaching the projected FY 2015 desired forest-wide capability of 101,748 based on the 2005 Forest Plan. Habitat capability for the Forest should improve with the implementation of the Revised Forest Plan which will increase the number of acres of early seral stage habitat. Habitat capability for bobwhite, as estimated by CompATS, has increased slightly since 2005. Although the creation of early successional habitat is showing a slight upward trend this habitat creation has not yet reached the Plan objective of 5,500 acres per year. The weak increasing trend for the Forest could be due to the aggressive prescribed burning and thinning programs which are providing habitat improvements. The Proposed Action, Alternative II, and Alternative III would result in improved habitat condition and increase habitat availability for this species. The No Action alternative would not result in any additional habitat improvements.

The turkey population has fluctuated over the years. Over the past several years (1990 – 2011), the number of turkey poult per hen has varied from a low of 1.4 poult per hen in 2011 to a high of 1.9 poult per hen in 2006. Since 2006 decreasing trends in habitat capability, harvest levels, poult per hen, and birds detected on the Landbird points. This does not negate the long term positive trend, but does identify potential problems that need watching. The habitat capability remains above the level set in the RLRMP and this sustained high level would indicate that the problem with turkey could be factors other than habitat related. The Proposed Action, Alternative II, and Alternative III would result in improved habitat condition and increase in habitat availability for this species; the No Action Alternative would not result in any additional habitat benefits.

The habitat capability for White-tailed deer shows a decreasing trend since 2006. However, deer harvest records indicate an upward trend with an increase of 12% from 2010-2011. The forest wide white-tailed deer habitat capability objective is 38,105 deer. The current habitat capability for white-tailed deer still exceeds Forest Plan objectives for deer per square mile. The Proposed Action, Alternative II, and Alternative III would contribute positively to deer by improving habitat condition and increasing habitat availability. The No Action alternative would not.

The landbird data for Prairie warbler indicate a slightly increasing population trend for the time period of 2006-2011. However, habitat capability for the Prairie warbler on the Ouachita National Forest continues to show a downward trend, which is consistent with range wide trends. This decline is considered directly related to the decline in the acres of early seral habitat. The Proposed Action, Alternative II, and Alternative III would result in improved habitat condition and an increase in habitat availability for this species; the No Action Alternative would not result in any additional habitat benefits.

The Pileated woodpecker has a stable to slightly decreasing population trend on the Ouachita National Forest based on landbird data. Habitat capability data suggest that this species' primary habitat, mature hardwood forest, is increasing. CompPATS estimating the habitat capability using all forest types indicate a decreasing trend. These data are for pine, pine-hardwood, hardwood, and hardwood-pine stands with the greatest value being for stands greater than or equal to 41 years old. As these stands age, the habitat capability to support the pileated woodpecker should continue to improve. The Proposed Action, Alternative II, and Alternative III would probably result in a temporary reduction of habitat for this species due to continued disturbance. However, over 1/2 of *West Haw Creek* is suitable habitat for pileated woodpecker. The No Action Alternative would probably result in no reduction in habitat for this species.

Forest Landbird point data for Scarlet tanager supports an overall stable to increasing trend for the Scarlet tanager. Hardwood and hardwood/pine forest types greater than 41 years old will continue to mature improving habitat for the Scarlet tanager. In 2011 the Ouachita National Forest had 568,851 acres of late seral habitat. The continued long-term viability of this species is not in question. The Proposed Action, Alternative II, and Alternative III would result in a temporary reduction of habitat for this species due to creation of early seral habitat. The No Action Alternative would result in no reduction in habitat for this species.

The Proposed Action, Alternative II, Alternative III and the No Action alternative would have no appreciable direct, indirect, or cumulative effects on stream habitats and the associated aquatic MIS. All streams would be protected from the direct

effects of logging, wildlife habitat improvement activities, and prescribed burning. Cumulatively, the proposed action would have no effect on stream habitats in *West Haw Creek* or the stream-associated MIS. This project would have no effect on Forest-wide trends of these MIS.

PROPOSED, ENDANGERED, AND THREATENED AND SENSITIVE (PETS) SPECIES

Introduction

West Haw Creek has the potential to be habitat for 14 species listed on the Ouachita PETS List. The Ouachita PETS List is attached to the Biological Evaluation of this Project. The BE is an attachment to this EA and is incorporated as reference (Garrett. January 2016).

PETS Species Evaluated

NUMBER OF SPECIES FOR THIS BE	SCIENTIFIC NAME	COMMON NAME
T&E SPECIES requiring FWS Concurrence (2)		
1	<i>Picoides borealis</i>	Red-cockaded woodpecker
2	<i>Myotis septentrionalis</i>	Northern Long-eared Bat
SENSITIVE SPECIES		
TERRESTRIAL ANIMAL SPECIES (3-6)		
3	<i>Myotis leibii</i>	Eastern Small-footed myotis
4	<i>Haliaeetus leucocephalus</i>	Bald Eagle
5	<i>Aimophila aestivalis</i>	Bachman's Sparrow
6	<i>Speyeria diana</i>	Diana fritillary
AQUATIC ANIMAL SPECIES (7-10)		
7	<i>Notropis ortenburgeri</i>	Kiamichi shiner
8	<i>Lampsilis hydana</i>	Louisiana fatmucket
9	<i>Obovaria arkansasensis</i>	Southern hickorynut
10	<i>Toxolasma lividus</i>	Purple lilliput mussel
RIPARIAN PLANT SPECIES (11-13)		
11	<i>Amorpha ouachitensis</i>	Ouachita false indigo
12	<i>Vernonia lettermannii</i>	Narrowleaf ironweed
13	<i>Vitis rupestris</i>	Sand grape
TERRESTRIAL PLANT SPECIES (14)		
14	<i>Carex latebracteata</i>	Waterfall's sedge

The U.S. Fish and Wildlife Service will be consulted for concurrence of determinations on any Proposed, Endangered, or Threatened (PET) species if required.

The following pages describe a brief present condition of each of the species listed above and their habitats. Detailed effects analyses are in the Biological Evaluation (Garrett. January 2016).

1. RED-CKADED WOODPECKER

Present Conditions: There are 2,233 acres of the *West Haw Creek* project area designated as MA 22. Currently, there are no active clusters present within the *West Haw Creek* EMU. There are 9 planned recruitment clusters without inserts planned for this EMU. The present habitat condition within this project area ranges from optimal to unsuitable. Much of the suitable habitat within *West Haw Creek* is slowly deteriorating due to mature pine stands becoming denser as a result of succession. Other areas in *West Haw Creek* are currently poor habitat due to dense overstory and midstory conditions at this time.

ENVIRONMENTAL EFFECTS

PROPOSED ACTION

Regeneration harvest of pine timber: Direct effects are expected to be discountable due to the unlikelyhood that an RCW or its cavity tree would be harmed during regeneration harvest of pine timber. RCW cavity trees on the Poteau/Cold Springs RD are well marked. Indirect and cumulative effects of pine regeneration cutting would delay the suitability of these areas for RCW foraging and nesting habitat; however, the effects of pine regeneration cutting within limits as with this Proposed Action would be positive in the long run by guaranteeing old age pine stands in the future.

Commercial thinning of pine timber: **Direct** effects are expected to be discountable due to the unlikelyhood that an RCW or its cavity tree would be harmed during timber thinning. RCW cavity trees on the Poteau/Cold Springs RD are well marked. **Indirect** and **cumulative** effects of pine harvest would be positive, due to the pine-bluestem grass restoration, which is ideal habitat for RCW.

Prescribed burning: Prescribed burning would have no **direct** effect on RCWs unless an active cavity tree with a nest is burned, which is a highly unlikely since all known RCW trees are prepped before burns by raking fuel away from the base of the trees and there are none presently in this EMU. It is possible that an unknown cavity tree may exist in the burn area but is unlikely due to the large amount of field work, RCW surveying, and monitoring being conducted in this area. **Indirectly** and **cumulatively**, these burns would help restore and maintain open forest conditions that are vital to RCWs.

Control of non-native invasive species (NNIS): No **direct** effect is anticipated for RCW during the control of NNIS. If any RCWs are in the area during the treatment of NNIS they will most likely seek cover and return after workers have left the area. **Indirect** and **cumulative** effects of controlling or eliminating NNIS plants would be positive, due to the restoration of native plants species and the associated influx of native insect species that serve as the forage base for RCW.

Wildlife and timber stand improvement: WSI and TSI treatments would have no **direct** effect on RCWs because only small pine trees and hardwoods would be cut. **Indirect** and **cumulative** effect would be positive, due to improved flight paths and the increased production of seeds, fruits and other plant foods on the ground and the production of insects associated with this herbaceous vegetation. These treatments are vital to the restoration of the pine-bluestem grass ecosystem, which is ideal habitat for the RCW.

Wildlife improvements: Ponds and temporary openings would have habitat effects similar to other disturbances. These disturbances would not affect RCW habitat quality or quantity.

The installation of nests boxes for other species of wildlife would have no **direct** effect on the RCW. **Indirectly** and **cumulatively**, the installation of these nest boxes may lower competition between other species of wildlife and RCWs for RCW cavities.

No **direct** effects are expected for the implementation of (RCW) treatments/activities. **Indirectly** and **cumulatively**, RCW habitat will be improved by maintaining and increasing cavity availability, reducing threats from competition, predation, and insects. The implementation of single-bird augmentations and multiple-bird group-initiations would encourage RCW population growth and expansion.

Road construction, reconstruction, and maintenance: No **direct** effect is anticipated for RCW during road construction, reconstruction and maintenance. If any RCWs are in the area during these activities they will most likely seek cover and return after workers have left the area. **Indirectly** and **cumulatively**, proposed roadwork would enable needed vegetation manipulation to occur that would improve habitat for RCWs.

Reforestation site preparation: No **direct** effect is anticipated for RCW during reforestation site preparation activities. If any RCWs are in the area during these activities they will most likely seek cover and return after workers have left the area. **Indirect** and **cumulative** effects will be positive due to the reestablishment of native shortleaf pine stand that will guaranteeing old age pine stands for RCW nesting and foraging in the future.

Firewood/Rock Permits: No permits will be issued inside active RCW clusters, thus no **direct** effects on RCWs are expected with these activities. **Indirect** effects for firewood permits are expected to be positive due to the removal of excess wildfire fuels that pose a threat to RCW foraging habitat. No **cumulative** effects are anticipated for these activities.

ALTERNATIVE II (same as Proposed Action without the use of herbicides):

The environmental effects of this alternative are the same as the Proposed Action.

NO ROAD CONSTRUCTION ALTERNATIVE III

The effects from this alternative would be the same as the other action alternatives except for the following:

Timber Harvest and WSI treatments: Thinning and WSI treatments would improve RCW habitat, but the limited acreage and coverage of the watershed would not be sufficient to sustain a healthy population of RCW's. This alternative would result on only four of the nine recruitment stands being suitable nesting habitat due to timber not being thinned to the optimal densities for RCW nesting habitat. In addition, foraging habitat would fall short of meeting the minimum 120 acres for all nine clusters due to timber not being thinned to the desired densities to be considered foraging.

NO ACTION ALTERNATIVE I

Habitat within *West Haw Creek* would continue to slowly deteriorate due to mature pine stands becoming denser, loss of ideal insect habitat, and increased midstory densities.

2. NORTHERN LONG-EARED BAT

Present Conditions

The northern long-eared bat has a large range that stretches over much of the Eastern United States and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and eastern British Columbia. In the United States they are found from Maine to Florida and West to Oklahoma and Montana (USDI FWS 2013).

Northern long-eared bats use an assortment of habitats across its range including both hardwood and coniferous forest. This species is known to use a wide variety of roost sites including caves, man-made structures, as well as living trees and snags of both hardwoods and conifers. Preferred roosting habitat appears to vary from region to region within its range. Research conducted on the Ouachita National Forest documented a preference for shortleaf pine snags as roosting sites (Perry and Thill, 2007). Both male and female used managed and unmanaged timber stands. However, research result showed that females preferred to roost in managed pine stands with low pine BA while males preferred to roost in more dense stands (Perry and Thill, 2007).

The northern long-eared bat was proposed to be listed as an endangered species by the UFWS in October 2013. The proposed listing of this species is primarily due to a disease referred to as White-nosed syndrome (WNS) that has caused a decline of 99 percent in the northern long eared bat population in the Northeastern states and is expected to spread throughout the United States (USDI FWS 2013). White-nosed syndrome is named for the white fungus evident on the muzzles and wings of affected bats. The white fungus is identified as *Pseudogymnoascus destructans* and thrives in cold

and humid conditions which are characteristic of the caves and mines used by bats during hibernation. Bats affected with WNS lose their fat reserves and often die from the disease.

ENVIRONMENTAL EFFECTS

PROPOSED ACTION AND ALTERNATIVE II

Timber, Silvicultural/Wildlife Stand Improvement Activities: Cutting trees for the various proposed timber treatments may result in **directly** killing or injury to bats and their young during the maternity period, when pups are non-volant (Wisconsin DNR, 2013), and may also disrupt roosting and maternity behavior. NLEBs are highly mobile and are capable of fleeing to avoid danger during non-pup rearing times. The NLEB may be impacted **indirectly** by noises associated with timber, silvicultural, and wildlife stand improvement activities, such as the sound of saws and/or general human interaction (USDI Fish and Wildlife Service, 2013a). Canopy and midstory openings resulting from the proposed action will increase the amount of sunlight reaching the forest floor. Increased sunlight will yield a more diverse understory allowing for a rise in the abundance of NLEB insect prey base.

Control of non-native invasive species (NNIS): It is highly unlikely that there would be any **direct** effect on the NLEB due to individuals coming into contact with recently sprayed vegetation. The NLEB emerges at dusk and any herbicides applied should be dried on the substrate they were sprayed on (Lacki, Hayes, & Kurta, 2007). Herbicides would be applied at the lowest effective rate in meeting project objectives in an attempt to reduce any potential negative effects to the environment. All label instructions and Forest Plan standards and guidelines will be followed.

Indirectly, herbicide application will decrease invasive vegetation and increase native vegetation, resulting in the overall enhancement of wildlife habitat (Guynn, Guynn, Wigley, & Miller, 2004). Further, the changes that result should provide a more abundant and diverse insect population, thus increasing foraging opportunities for the NLEB (Lacki, Hayes, & Kurta, 2007). Food ingested from herbicide treated areas immediately following treatment could result in harm to the NLEB. However, NNIS treatments would likely occur on extremely small acreages. Any food ingested from these areas would likely be minimal and likely below the LD50 for the NLEB.

Prescribed Fire: Prescribed Burning can occur during the Dormant Season or during the growing season. Prescribed burning during the dormant season would have no **direct** effects, as there are no known Hibernacula on the Poteau/Cold Springs Ranger District. A growing season burn during the pup season could have the **direct** effect of burning a snag with a non-volant juvenile roosting in the tree, or mortality due to toxic gases and the inability to fly out of burn area. Prescribed Fire due to its lower intensity is less likely to burn all snags, and would also cause less Toxic gas and radiant heat than a high intensity wildfire. **Indirect** effects would be positive due to creating snags, stimulating the growth of herbaceous vegetation, a more abundant prey base, and lowering the risk of a wildfire.

Wildlife Treatments: Wildlife treatments include nest structures, and pond construction and reconstruction.

- ✓ Pond Reconstruction: No **direct**, **indirect** or **cumulative** effects are expected by pond work due to the small acreage associated with each site, and existing ponds having only small trees, brush and grasses on them.
- ✓ Nest structures: No **direct**, **indirect** or **cumulative** effects from this activity.

Transportation System: Individual bats may be **directly** injured or killed if roost trees are cut during the maternity season. **Indirectly**, these activities also have the potential to disrupt roosting and maternity behavior. Removal of trees along reconstructed roads and/or skid trail corridors may result in a loss of roosting habitat. There is 1.0 mile of Permanent new constructed roads purposed in this EMU. This new road would be constructed in a more sustainable location and allow obliteration of a 1.9 mile section of poorly located road. This would result in an overall improvement to the watershed by reducing sedimentation and open road density. Approximately 3.6 acres of permanently lost habitat would occur from the purposed new road construction; however 6.9 acres of new habitat would be created by obliterating 1.9 miles of road in the poor location. The decommissioning of roads will help decrease noise, while retaining the open areas used by NLEBs for foraging (Perry, Thill, & David Jr., 2008). The removal of roost trees could have a **direct** effect on pups during the non-volant season, resulting in injury or mortality. All known NLEB hibernacula are over 20 miles south of any new road construction in this project area; therefore there should be no **direct** or **indirect** effects during hibernation or swarming seasons.

Special Use Permits: No direct, indirect or cumulative effects from this activity.

NO ROAD CONSTRUCTION ALTERNATIVE III

The effects from this alternative would be the same as the other action alternatives except for the following:

Transportation System: No direct effect is expected during performing pre haul maintenance and reconstruction activities since only saplings and brush will be removed from the ditch lines. Indirectly, noise from these activities have the potential to disrupt roosting and maternity behavior. All known NLEB hibernacula are over 20 miles south of any new road construction in this project area; therefore there should be no direct or indirect effects during hibernation or swarming seasons.

NO ACTION ALTERNATIVE I

The retention of existing pine and hardwood forested conditions without human-caused disturbance would continue to offer roosting and nesting habitat. Diversity of foraging conditions would decline as succession continued. Without the creation of early successional habitat, insect diversity and abundance would likely decline, resulting in a loss of foraging opportunities for the Northern long-eared bat.

Cumulative Effects

No other projects are taking place within this EMU thus no cumulative effects are anticipated with implementation of this project.

3. EASTERN SMALL-FOOTED BAT

Present Conditions

In Arkansas the Eastern small-footed bat is known in small numbers from only a few caves in the Ozarks and has been documented on Mt. Magazine in Logan County. Preliminary results from acoustic surveys performed on the Ouachita National Forest in August and September of 2009 indicated that this species is present in low numbers in Scott and Montgomery Counties. Prior to this survey this species was not known from the caveless region of western Arkansas.

ENVIRONMENTAL EFFECTS

PROPOSED ACTION AND ALTERNATIVE II

Eastern small-footed bats are highly mobile during the active season and it is unlikely that an adult would be **directly** harmed during The Proposed Action (logging, prescribed burning, control of NNIS, pond reconstruction, road work, silvicultural treatments, RCW treatments/activities, WSI). However, it is possible that young could be **directly** impacted if a maternity site was destroyed during timber harvest or prescribed burning. Habitat suitable for hibernation (caves, mines and rock talus areas) has not been found within this project area. Therefore, it is highly unlikely that this species would be harmed during the inactive season. **Indirect** and **cumulative** impacts from timber harvest, WSI, TSI, wildlife opening development/maintenance, and treatment of NNIS would be positive as this habitat would temporarily become more open which would improve flight paths and increasing habitat for the insect prey base.

NO ROAD CONSTRUCTION ALTERNATIVE III

The effects from this alternative would be the same as the other action alternatives except for the following:

Transportation System: The direct impacts from performing transportation system activities under this alternative will be the same as the proposed action and alternative II except to a lesser degree since no new road construction is proposed. However, direct impacts will be to a greater degree than the no action alternative. Indirectly, this alternative would not result in as many acres of improved foraging habitat as the proposed action and alternative II due to timber harvest occurring on less acres.

NO ACTION ALTERNATIVE I

The No Action alternative would have no “direct impacts” upon this bat but also would not indirectly create habitat for the species.

4. BALD EAGLE

Present Conditions

Breeding habitat is usually close to large water bodies that provided desired food sources such as fish and waterfowl. Winter roosting sites appear to be closely related to available food sources, but may not be close in proximity to water if abundant alternative food sources are available such as small mammals and carrion. The nearest known bald eagle nest is approximately 6 miles east of the *West Haw Creek* project area.

ENVIRONMENTAL EFFECTS

PROPOSED ACTION, ALTERNATIVE II, ALTERNATIVE III

Timber harvest and reforestation: There should be no **direct, indirect, or cumulative** effect on bald eagles. This is because all trees with obvious large nests will be protected as outlined in the national bald eagle management guidelines.

Wildlife treatments:

- WSI/TSI would have no **direct** impacts on bald eagles because the trees to be cut are too small to be used as roost or nest trees. WSI/TSI will take place outside of the nesting season in the event that a bald eagle nest is located. **Indirect and cumulative** impacts associated with these activities are not anticipated for this species.
- Ponds, temporary wildlife openings, and control of NNIS would have no **direct, indirect, or cumulative** impact. The effects are similar to timber harvest and reforestation (above).
- RCW treatments/activities and Firewood/Rock Permits would have no **direct, indirect, or cumulative** effect due to these actions taking place away from optimal bald eagle nesting and roosting habitat. These actions would not negatively or positively alter bald eagle habitat.

Transportation system: No direct effects are predicted since roadwork will not occur near an eagle nest or winter roost site. Indirectly and cumulatively, these roads would have no effect on bald eagles.

Prescribed burning: Prescribed burning would have no **direct** impact on bald eagles unless a nest tree with young was burned down, which is unlikely since all known eagle trees will be prepped before burns by raking fuel away from the base of the trees. It is possible that an unknown nest tree may exist in the burn area but is unlikely due to a very large amount of field work being conducted in this area and surveying that has been performed. If an unknown nest does exist in the burn area it likely would not be damaged since eagles normally build their nest high up in the canopy of mature trees. **Indirectly and cumulatively**, these burns would help protect nest trees from catastrophic wild fires by reducing wildfire fuel loads.

NO ACTION ALTERNATIVE I

The No Action alternative would have “no direct impacts” upon this bird.

5. BACHMAN’S SPARROW

Present Conditions

In past years, this species was found in very young pine regeneration areas, but with the end of clearcutting in the early 1990s, most records (involving the distinctive song) come from older pine stands maintained in an open condition with prescribed burning. There are 0 acres of early seral stage habitat (0-10 years old stands) in *West Haw Creek* that could be considered suitable habitat for this species.

ENVIRONMENTAL EFFECTS

PROPOSED ACTION, ALTERNATIVE II, ALTERNATIVE III

It is unlikely that an adult Bachman’s sparrow would be **directly** harmed during The Proposed Action (logging, road work, special use permits, pond reconstruction, control of NNIS, silvicultural treatments, RCW treatments/activities, and WSI. Bachman’s sparrow would most likely seek cover while workers are in the area and return later. If logging, silvicultural treatments, or WSI occurred during the nesting season it is possible that Bachman’s sparrow nest could be lost but is unlikely since areas in need of treatment is usually not optimal habitat. **Indirectly and cumulatively**, this Proposed Action would increase the amount of suitable habitat for this sensitive species.

NO ACTION ALTERNATIVE I

The No Action alternative would have “**no direct impacts**” upon this bird. **Indirectly**, habitat would continue to deteriorate due to succession. Suitable habitat could result from unplanned natural events like wildfires and insect outbreaks.

6. DIANA FRITILLARY

Present Conditions

This species has been observed in various areas throughout the district. Most of the older scattered records involved sunny openings associated with roadsides. Surveys on the Poteau RD indicate this species to be common in Management Area 22 where timber thinning, WSI, and repeated prescribe burning has produced approximately 40,000 acres of open, park-like forest.

ENVIRONMENTAL EFFECTS

PROPOSED ACTION, ALTERNATIVE II, ALTERNATIVE III

The Proposed Action, Alternative II, and Alternative III are not likely to have a direct effect on this species as there is little suitable habitat currently present in this project area. These three “action” alternatives would indirectly create suitable habitat for this butterfly in the future. It is extremely unlikely that these action alternatives would have any **direct** impacts on adult butterflies since they are highly mobile. However, there is the possibility of harming eggs and larvae if the actions occur during the reproductive season. **Indirect** impacts would be positive. Logging, WSI, control of NNIS, and prescribed burning would improve habitat for Diana fritillary by stimulating new herbaceous plant growth that would most likely contain desired nectar producing species and violets for egg deposition. No significant cumulative impacts are anticipated on the Diana fritillary with the proposed project area.

NO ACTION ALTERNATIVE I

The No Action alternative would have “**no direct impacts**” upon this butterfly but also would not **indirectly** create habitat for the species.

7. – 10. SENSITIVE AQUATIC ANIMAL SPECIES

7	<i>Notropis ortenburgeri</i>	Kiamichi shiner	Fish
8	<i>Lampsilis hydiana</i>	Louisiana fatmucket	Mollusk

9	<i>Obovaria jacksoniana</i>	Southern hickorynut	Mollusk
10	<i>Toxolasma lividus</i>	Purple lilliput mussel	Mollusk

Present Conditions

Several unnamed ephemeral streams occur on Forest Service property within this EMU. All of these unnamed streams drains into Haw creek which flows into the Poteau River. None of the five sensitive aquatic species listed above are likely to occur in this EMU do to the streams lacking constant flow, but could potentially occur downstream from the project area. All five of these species have been documented to occur within the Poteau River.

ENVIRONMENTAL EFFECTS

PROPOSED ACTION, ALTERNATIVE II, ALTERNATIVE III

Vegetation management: All activities connected with timber management and WSI occur in upland pine stands, which have been designated as lands suitable for timber production. There are specific restrictions on use of heavy equipment within SMZs that protect stream quality. Vegetation management would not **directly, indirectly, or cumulatively** affect these sensitive aquatic species.

Control of non-native invasive species (NNIS): The use of herbicides to control NNIS will have no **direct, indirect, or cumulative** effect on the five sensitive aquatic species because herbicides will only be used as per Revised Forest Plan directions and will not be used within streamside zones.

Wildlife Activities: Pond reconstruction, temporary wildlife openings, RCW treatments/activities, and nest structures all occur in upland pine stands and would not **directly, indirectly, or cumulatively** impact these sensitive aquatic species.

Special Use Permits: There would be no **direct, indirect, or cumulative** impact on these sensitive species by issuing special use permits in *West Haw Creek EMU*. This is because these activities involve minimum disturbance that occurs away from streamside zones.

Road construction, reconstruction, maintenance and use: Properly constructed and maintained roads reduce problems of runoff detrimental to streams. Road work in this EMU would have no **direct, indirect, or cumulative** impacts on these species due to protective measures for streams within the Forest Plan.

While temporary stream crossings and fording of streams during road construction and during hauling of logs will occur, these five species will not be present at the ford sites since habitat for these species is unsuitable due to the intermittent quality of these streams. No **direct, indirect, or cumulative** impacts on these species will occur.

Prescribe burning: Low intensity burning should have little or no impact on water quality (Bidwell, et al., no date: 2877-10). Therefore, limitations of forest management activities within SMZs included in the Forest Plan would protect these aquatic sensitive species from undesirable impacts.

NO ACTION ALTERNATIVE I

The No Action alternative would have “**no impacts**” upon these aquatic species.

11. - 13. SENSITIVE RIPARIAN AREA PLANT

11	<i>Amorpha ouachitensis</i>	Ouachita false indigo
12	<i>Vernonia lettermannii</i>	Narrowleaf ironweed
13	<i>Vitis rupestris</i>	Sand grape

Present Conditions

All three of these sensitive riparian plant species are endemic species to the Ouachita Mountains and are locally abundant. Threats to these species would be similar to those for fish and mollusks. All of these species are protected through the implementation of Revised Forest Plan Standards for protection of streamside zones.

ENVIRONMENTAL EFFECTS

PROPOSED ACTION, ALTERNATIVE II, ALTERNATIVE III

Vegetation management: Most activities connected with timber management and WSI occur in upland pine stands, which have been designated as lands suitable for timber production. There are specific restrictions on use of heavy equipment within SMZs that protect stream quality. Restrictions on herbicide use within the Forest Plan would protect SMZs and therefore limit impacts on these plant species. Vegetation management would not **directly, indirectly or cumulatively** impact these sensitive riparian area plant species.

Control of non-native invasive species (NNIS): The use of herbicides to control NNIS will have no **direct** effect on the three sensitive riparian plant species because herbicides will only be used as per Revised Forest Plan directions and will not be used within streamside zones. **Indirect** and **cumulative** effects of controlling or eliminating NNIS would be positive, due to reducing the spread of NNIS and the restoration of native plants species.

Prescribe burning: Low intensity prescribed burns often go out in SMZs and should have discountable impacts. Fireline construction will mostly occur in upland habitat and will follow forest plan restrictions for SMZs but individuals may be **directly** impacted. Little to no **indirect** or **cumulative** impacts are anticipated for these three sensitive riparian plant species.

Wildlife Activities: Pond reconstruction, temporary wildlife openings, RCW treatments/activities, and nest structures all occur in upland pine stands and would not **directly, indirectly, or cumulatively** affect these three sensitive riparian plant species.

Road construction, reconstruction and maintenance: Road construction will not occur across SMZs at sensitive plant locations. Properly constructed and maintained roads reduce problems of runoff detrimental to streams and streamside zones. Road work in this EMU would have no **direct, indirect, or cumulative** impacts on these species due to protective measures for streams within the Forest Plan.

Special Use Permits: There would be no **direct, indirect, or cumulative** impact on these sensitive species by issuing special use permits since these actions will only take place in upland habitat in this EMU.

NO ACTION ALTERNATIVE I

The No Action alternative would have “no impacts” on these plant species.

16. SENSITIVE PLANT: WATERFALL’S SEDGE

Present Conditions

Waterfall’s sedge is an endemic species to the Ouachita Mountains and is locally abundant. It is found in a variety of habitats such as shaley roadsides, dry shale woodlands, riparian areas, mesic oak hickory forest, pine and pine hardwood

forest, and mazarn shale, and novaculite glades. This species receives some natural protection from human disturbance by the diversity of its preferred habitats, as described above. Many of the known locations for this species on the Ouachita National Forest are on sites located within areas that have undergone timber management activities and in areas that have been burned.

ENVIRONMENTAL EFFECTS

PROPOSED ACTION, ALTERNATIVE II, ALTERNATIVE III

The proposed Action may **directly** impact individual plants through uprooting, or by burying plants under displaced soils. The use of herbicides to control NNIS will have no **direct** effect on this sensitive plant because herbicides will only be used as per Revised Forest Plan directions. Site-specific surveys for PETS plant species will be conducted prior to the treatment of NNIS to identify, delineate, and protect any PETS plant species present at treatment sites. **Indirect** impacts of controlling or eliminating NNIS would be positive, due to the restoration of native plant species. Vegetation management should have minimal **indirect** impacts since waterfall's sedge appears to tolerate practices that mimic natural disturbance so species viability and distribution are not anticipated to be significantly impacted. Prescribe burning and associated actions are the only other known actions taking place in this EMU and no **cumulative** impacts are anticipated for Waterfall's sedge in the *West Haw Creek* EMU.

NO ACTION ALTERNATIVE I

The No Action alternative would have “**no impacts**” on this plant species.

PETS Species Summary of Determinations of the Proposed Action

Species evaluated in the BE	Scientific Name	Common name	Determination
1	<i>Picoides borealis</i> Endangered	Red-cockaded woodpecker	Not Likely to Adversely Affect
2	<i>Myotis septentrionalis</i> Threatened	Northern Long-eared Bat	Likely to Adversely Affect
3	<i>Myotis leibii</i>	Eastern Small-footed Bat	May impact individuals but is not likely to cause a trend to Federal listing or a loss of viability
4	<i>Haliaeetus leucocephalus</i>	Bald Eagle	No Impacts
5	<i>Aimophila aestivalis</i>	Bachman's Sparrow	May impact individuals but is not likely to cause a trend to Federal listing or a loss of viability
6	<i>Speyeria diana</i>	Diana fritillary	May impact individuals but is not likely to cause a trend to Federal listing or a loss of viability
AQUATIC ANIMAL SPECIES 7. - 10.	<i>Notropis ortenburgeri</i> , <i>Lampsilis hydiana</i> , <i>Obovaria arkansasensis</i> , <i>oxolasma lividus</i>	Kiamichi shiner, Louisiana fatmucket, Southern hickorynut, Purple Lilliput mussel	No Impacts
RIPARIAN PLANTS 11. – 13.	<i>Amorpha ouachitensis</i> , <i>Vernonia lettermannii</i> , <i>Vitis rupestris</i>	Ouachita false indigo, Narrowleaf ironweed, Sand grape	May impact individuals but is not likely to cause a trend to Federal listing or a loss of viability
14	<i>Carex latebracteata</i>	Waterfall's sedge	May impact individuals but is not likely to cause a trend to Federal listing or a loss of viability

INSECT AND DISEASE

Present Conditions

Hypoxylon canker is a disease (fungus) that has become established in the red oaks throughout the Ouachita National Forest. It is in West Haw Creek as a result of stressed conditions brought on by several years of summer drought and overstocked conditions. The ice storms of 2000 and 2013 added to this stress by causing physical damage to the majority of trees of all species district-wide. The fungus infects stressed trees through wounds and either produces a canker or quickly kills the tree by colonizing the sapwood. Fruiting structures develop on the cankers and spores are discharged at a rapid rate into the air and spread to new hosts through wounds. Hypoxylon cankers are generally secondary to other stressing conditions, in this case drought, ice storm damage, and age. This disease is always present in the forest but in normal conditions the individual trees, if healthy, are able to resist and overcome any infection. After the hypoxylon canker became established, secondary pests come in including red oak borers and two-lined chestnut borers. Under normal conditions most healthy red oaks would be able to withstand or overcome an infestation of these insects, but the same stress factors that caused the red oaks and some white oaks to become infested with hypoxylon canker also causes them to become susceptible to these insects. At this time most of the red oaks that have died or are infected with hypoxylon canker are scattered along the ridge tops in small pockets. These affected areas are also stocked with various mature white oaks, hickories, and shortleaf pines, which are surviving and still occupying the sites. Hypoxylon canker has infested other parts of the district more severe than in West Haw Creek so far but it is established here. If it does become worse, there would be an absence or reduction of red oak and white oak acorn production for a 20 to 25 year period in the most severely affected areas. This is the average age for red oaks and white oaks to begin producing acorns.

Southern pine beetles are also present in small numbers in some individual shortleaf pine trees that are stressed or injured. In normal years most shortleaf pine would be able to withstand or overcome an infestation of this insect if healthy and growing conditions are favorable. In 1995, due to several years of warmer than normal winters, the populations grew to epidemic proportions and infested not only weaker trees (due to overstocked conditions and drought) but also healthy trees. Aerial detection flights located several infestations throughout the district in stands that had mature, heavy stocking. These were active spots that quickly grew until management and salvage operations were able to catch up and keep them in check. Several spots were approximately 2 acres when found or when controlled. Most other SPB spots were 0.25 acre or less and inactive when found and were monitored. The summer of 2011 was also a very dry time that created enough stress in the shortleaf pine to increase the Ips beetle populations throughout the district. These beetles could become established within West Haw Creek if the area continues to be in rain deficit in FY 14 and beyond. According to Jim Smith the Regional Entomologist from an e-mail in June 2012 SPB's have become established all over Mississippi and could move toward the Ouachita N.F. in the near future.

ENVIRONMENTAL EFFECTS

The geographic boundary for the effects on vegetation would be all of the compartments within the *West Haw Creek* Ecosystem Management Unit boundary. Timelines for measuring the effects on vegetation would be from 2014 to 2020-2025 or from entry period to entry period. Methods of analysis include reviewing the past history of the project area, interpreting the field data collected throughout the project area to establish existing and desired conditions. The proposed actions developed to meet the desired conditions are analyzed to determine what the direct effect of these actions would be and what the cumulative effects would be to the vegetation in the overstory, midstory, and understories.

PROPOSED ACTION

Similar to the Proposed Action section in Vegetation of this chapter, the large amount of acres of mature pine and hardwood timber types make *West Haw Creek* susceptible to insect and disease infestations. The proposed actions would immediately create conditions allowing all forest types to remain healthy and more resistant to insect or disease infestations by reducing competition for limited water and nutrients.

CUMULATIVE EFFECTS

The proposed commercial thinning, timber stand improvements, and to some extent wildlife stand improvements would improve the health of the affected stands by enabling the stands to withstand and overcome insect or disease infestations and respond to the silvicultural treatments with increased vigor until the next entry period 10 to 15 years down the road.

NO ACTION ALTERNATIVE I

A **direct** result of letting these infestations run their course could be large areas of dead or dying overstory and midstory and infesting adjacent watersheds over a several year period until natural events or predators stopped them or they ran out of a suitable host or food source in *West Haw Creek*. **Indirect** results would be vigorous response of growth from the understory and possible change in forest types. If the hypoxylon canker becomes established here the way it has in other parts of the district, there would be an absence or reduction of red oak acorn production for a 20 to 25 year period in the most severely affected areas due to tree mortality. The 20 to 25 years is the average age for red oaks to begin producing acorns. In this absence other invader species or non-native species could eventually occupy the site. Offsite species like cedar and red maple many times become established in enough numbers to crowd out or shade out the oaks, hickories, and other mast producing trees.

CUMULATIVE EFFECTS

If disease or insect infestations are allowed to run their course a **cumulative effect** could be large openings created where native pine or hardwoods once occupied the site. The openings would be established with vegetative species such as forbs, grasses, and other shade intolerant species responding with rapid growth eventually changing the native forest type. Another **cumulative effect** could be loss of site productivity due to soil loss from erosion or impact on water quality due to sediment deposits in the Poteau River if a hot wildfire removes the duff layer and is followed by a heavy rain.

NO HERBICIDE ALTERNATIVE II

These effects mimic those of the Proposed Action without the effects of herbicide use.

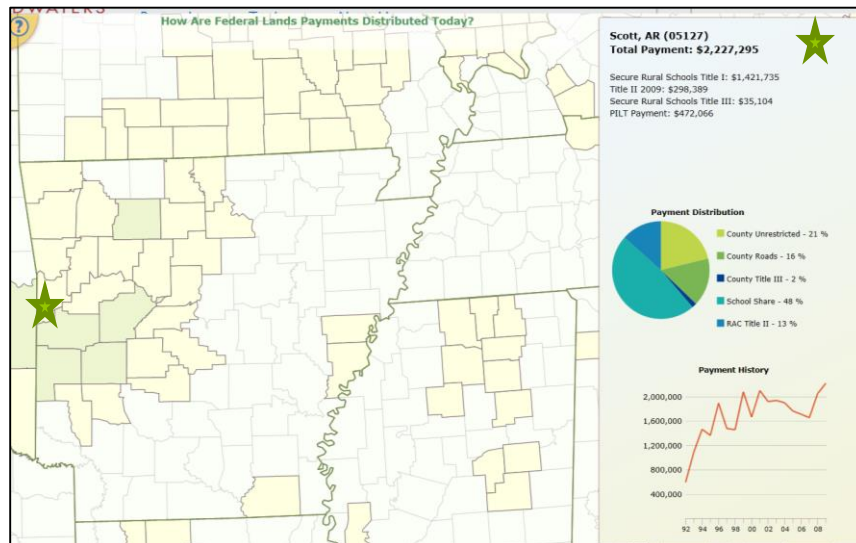
NO ROAD CONSTRUCTION ALTERNATIVE III

This alternative would not include temporary road construction to provide access to stands in need of silvicultural treatment; only areas with existing access would be treated. The effects of this alternative would be the same as the Proposed Action except the reduction in competition would occur on fewer acres.

ECONOMY

Present Conditions

The 2014 annual median household income for Scott County, Arkansas, is \$33,202 according to Arkansas Income-Census (<http://www.discoverarkansas.net/cgi/dataanalysis/incomeReport.asp?menuchoice=income>). The unemployment rate in November 2015 was 4.1. The population for Scott County according to the 2014 Census Population was 10,693. The economic base of the county is timber with 82% of the land area in timber of which 62% is U.S. Forest Service owned and 20% is privately owned. Livestock and poultry production along with food processing also helps make up the economic base (<http://scottcountyar.com/>). The local timber industry depends on National Forest land for a source of raw material. Many local residents depend on firewood from timber and wildlife activities on the district such as regeneration harvest, site preparation, and wildlife midstory reduction. Approximately 369,618 acres of Scott County is National Forest System lands. The following insert displays how Federal Land payments are distributed in Scott County, Arkansas.



<http://headwaterseconomics.org/dataviz/federal-land-payments> (1/29/2016)

ENVIRONMENTAL EFFECTS

The geographic boundary for the effects on the local or county economy is Scott County. The timeframe used for measuring these effects is the duration of implementation of the activities included in the project financial efficiency analysis. Quick-Silver 7 was used to determine the financial efficiency of each Alternative. This program is a project analysis tool that utilizes a MS Access database for use by forest managers to determine the economic performance of long-term investments.

PROPOSED ACTION

Directly, harvesting sawtimber and roundwood would support the local timber industry's need for raw material and the local residents need for firewood. The treatments proposed would also provide employment for forest industry workers. The Proposed Action has a revenue cost ratio of **1.51**, which means that it does pay for itself from timber receipts. **Indirectly**, timber harvesting would improve wildlife habitat. Also, the money that local forest industry workers earned would be circulated within the local business communities.

CUMULATIVE EFFECTS

Cumulatively, *West Haw Creek* would move toward its desired future condition while providing raw material to the timber industry, firewood to local residents, and improved hunting. The unemployment rate would be stabilized in the forest industry; local businesses would provide demanded services; and the national forest would remain healthy.

NO ACTION ALTERNATIVE I

Directly, this alternative would not provide raw material to the timber industry, no firewood to the local community, or improve hunting in *West Haw Creek*. **Indirectly**, Forest industry workers would have to travel further distances for employment. Businesses would suffer the loss of local forest industry workers not having money to circulate.

CUMULATIVE EFFECTS

Cumulatively, *West Haw Creek* would not move toward its desired future condition to improve and maintain the health of the forest stands of timber or provide suitable habitats for wildlife. Also by products of these activities such as timber would not be available. Unemployment rate could increase due to local forest workers not being able to find local jobs. Local businesses could close due to less money in local economy.

NO HERBICIDE ALTERNATIVE II

Direct, indirect, and cumulative effects from herbicide use will be non-existent for this alternative. All other effects are estimated to be the same as those in the Proposed Action since proposed treatments are the same, minus the effects of herbicide application.

NO ROAD CONSTRUCTION ALTERNATIVE III

Directly, harvesting sawtimber and roundwood would support the local timber industry's need for raw material and the local residents need for firewood. The treatments proposed would also provide employment for forest industry workers. This alternative has a revenue cost ratio of **1.08**, which means that it does pay for itself from timber receipts. **Indirectly**, timber harvesting would improve wildlife habitat. Also, the money that local forest industry workers earned would be circulated within the local business communities.

CUMULATIVE EFFECTS

Cumulatively, *West Haw* would move toward its desired future condition while providing raw material to the timber industry, firewood to local residents, and improved hunting. The unemployment rate would be stabilized in the forest industry; local businesses would provide demanded services; and the national forest would remain healthy.

PROJECT FINANCIAL EFFICIENCY ANALYSIS

The Proposed Action and No Herbicide Alternative would both have costs and revenues associated with the sale of timber. Costs include activities that are directly associated with timber management (site preparation, timber sale administration, road maintenance, etc.). Revenues are generated from the sale of timber. The Quick-Silver 7 evaluation of the financial efficiency of each alternative is displayed in the table below. The detailed costs, revenues, and the complete Quick-Silver analysis report are in the Project file.

Comparison by Financial Efficiency

Cost/Income Activities	No Action Alt. I \$	Proposed Action \$	No Herbicide Alt. II \$	No Road Construction Alt. III \$
Present Value of Revenues¹	0	680,605.35	680,605.35	266,652.10
Present Value of Costs²	0	-449,409.27	-449,409.27	-245,904.11
Present Net Value³	0	231,196.09	231,196.09	20,747.99
Revenue/Cost Ratio⁴	N/A	1.51	1.51	1.08

1- Present Value of Revenues – The sum of all revenues discounted at some interest rate. 2- Present Value of Costs – The sum of all costs discounted at some interest rate. 3- Net Present Value – The sum of the present value of the revenues minus the sum of the present value of the costs. 4- Revenue/Cost Ratio – Present value of revenues divided by the present value of costs.

The Present Net Value and Revenue/Cost Ratio are the same for both action alternatives. The first priority even with the Proposed Action is to use prescribed fire and hand tool treatments. Past history shows this to be successful and explains why there is no difference in cost calculations when compared to the No Herbicide Action alternative.

PUBLIC HEALTH AND SAFETY

Present Conditions

Refer to the present conditions described in the Air Quality section and the Water Resources & Quality section of this Chapter.

METHODS OF ANALYSIS

Site-specific risk assessments developed by Syracuse Environmental Research Associates (SERA) have been conducted for this analysis area as required by the Revised Forest Plan and are located in the project file (Revised Forest Plan, Part

3, pg 87, HU002). The SERA Human Health and Ecological Risk Assessments worksheets for Glyphosate March 25, 2011, Triclopyr May 24, 2011, and Imazapyr date December 16, 2011 are a series of excel spreadsheets designed to analyze the risks associated with use of specific herbicides. These worksheets allow for the generation of project specific analysis of potential herbicide use. Refer to the Air Quality methods of analysis in this Chapter.

ENVIRONMENTAL EFFECTS

PROPOSED ACTION AND NO ROAD CONSTRUCTION ALTERNATIVE III

Only one or the other of the three herbicides will be used, if any herbicide is used. The herbicides under consideration, glyphosate, triclopyr, and Imazapyr are available commercially in products called Round-up, Accord, Garlon, and Arsenal or other brand names. Herbicides proposed for use would be mixed and applied at the lowest rate effective in meeting project objectives and according to guidelines for protecting human and wildlife health. Application rate and work time must not exceed levels that pose an unacceptable level of risk to human or wildlife health. Herbicides are proposed as a last resort for release in the Proposed Action.

Glyphosate is a biodegradable herbicide classed as practically non-toxic, with an oral LD50 of >5000 mg/kg (a single lethal dose that kills 50 percent of a test population). Using toxicological data, the EPA has established the human acceptable daily intake (ADI) value for glyphosate at 0.10 mg/kg body weight/day. This ADI value translates into a maximum permissible intake (MPI) value of 6 mg glyphosate/day for the entire human life span. The Revised Forest Plan allows for herbicide use at the lowest effective rate. The watershed analysis calls for the potential use of 1.3 pounds/acre of Glyphosate to be used for cut-surface treatments and 1 pound/acre for foliar spray treatments. In the SERA Final Report for the Risk Assessment on Glyphosate they used a typical application rate of 2 pounds/acre and found the following: “Based on the typical application rate of 2 lbs a.e./acre, none of the hazard quotients for acute or chronic scenarios reach a level of concern even at the upper ranges of exposure. This is consistent with the risk characterization given by U.S. EPA/OPP (1993c. p.53): Based on the current data, it has been determined that effects to birds, mammals, fish, insects, and invertebrates are minimal”. Given this, no further analysis of Glyphosate was done using the SERA worksheets.

Triclopyr is a broad-spectrum herbicide that is also biodegradable and practically non-toxic. In forestry, it is labeled for site preparation and release. Methods of application include cut-surface treatments, foliar spray, and basal bark spray. Triclopyr is primarily absorbed by plant leaves and is readily moved throughout the plant. It affects plants by interfering with normal growth processes. In soil, triclopyr is not highly mobile. It is rapidly broken down by soil microorganisms and ultraviolet light. It is present an average of 30-56 days depending on soils and weather. Its half-life in water is about 10 hours at 72°F. Triclopyr-acid would be applied at a rate of up to 4 lbs/acre for cut-surface treatments and triclopyr-bee at a rate of up to 2 lbs/acre for foliar spray.

Imazapyr is a broad-spectrum herbicide, classed as practically non-toxic, used to control a variety of grasses, broadleaf weeds, vines, and brush species. In forestry, it is used for release and site preparation. Methods of application include foliar spray, basal bark spray, and cut surface treatments. Imazapyr is absorbed by plant leaves and rapidly transported via the phloem and is able to control deep root systems.

The project-specific SERA worksheets completed for this herbicide indicated an increased hazard under certain scenarios in the use of glyphosate. The risk characterization of a worker applying herbicides using a “directed ground spray (backpack)” shows an increased risk for both the typical and upper level applications. This risk can be mitigated however, by requiring the worker to wear the proper attire and safety equipment; have properly functioning equipment; apply the herbicide at the proper rate; work in an organized fashion so as to not re-enter treated areas; by not exceeding the “typical” length of workday (7 hours) and other measures. The risk characterization for the general public on the SERA worksheets shows several scenarios with an increased risk of acute/accidental and chronic exposures. Public safety in and around areas of herbicide use is a high priority concern.

Measures are taken to help ensure that the general public does not come in contact with herbicides. These include posting warning signs on areas that have been treated; selectively targeting for application only that vegetation that needs to be controlled rather than using a broadcast application; establishing buffer zones of non-treatment around private property,

streams, roads and hiking trails; carefully transporting only enough herbicide for one days use; mixing it on site away from private land, open water or other sensitive areas; properly maintaining and operating equipment (e.g. no leaks); and having good accident preplanning and emergency spill plans in place. These measures along with others are incorporated into contracts and through good enforcement and administration will be effective in reducing the risk of accidental contamination of humans or the environment. Herbicides and application methods were chosen to minimize risk to human and wildlife health and the environment (Revised Forest Plan, Part 3, pg 87, HU004).

The Revised Forest Plan includes standards for applying herbicides to reduce the possibility of adverse effects. These standards are required at all phases of the project including being incorporated as clauses in contracts (Revised Forest Plan, Part 3, pp 77, 80, 87-89, and 106). In conclusion, application of herbicide at the stated rates would pose only an acceptably low risk to the workers and public in the environment. Indirect risks to the public from the use of hand tools would include the risk of falling on a remaining stump-stub. This risk would be minimized by maintaining attention to one's path of foot traffic. Although hand tools pose a risk to forest workers for injury and accidents, the required proper personal protective equipment would lessen the likelihood of injuries. Refer to the Air Quality section of this Chapter for disclosure of effects on public health and safety from prescribed burning.

CUMULATIVE EFFECTS

Refer to the Air Quality section and Water Quality section of this Chapter for cumulative effects on public health and safety from prescribed burning. There are no other known or expected activities within the geographic bounds and timelines that would contribute to a cumulative effect on public health and safety.

NO HERBICIDE ALTERNATIVE II

The direct, indirect, and cumulative effects of Alternative II would be the same as those disclosed above for the Proposed Action with the exception of herbicide use. Since no herbicides would be utilized under this alternative, there would be no direct, indirect, or cumulative effects on public health and safety resulting from herbicide use.

NO ACTION ALTERNATIVE I

No direct effects on public health and safety would occur. No Action could have a negative indirect effect to public health and safety in the event that wildfires occur and create excessive smoke, or smoke that fails to disperse.

CUMULATIVE EFFECTS

There are no other known or expected activities within the geographic bounds and timelines that would contribute to a cumulative effect on public health and safety.

RECREATION RESOURCES

Present Conditions

West Haw Creek has a rich history of recreational hunting of various game species. This includes whitetail deer, eastern wild turkey, bobwhite quail, raccoon and limited black bear hunting. There are a few scattered primitive hunter camps within this area, but no developed sites. Some forest visitors do recreate in this area by driving for pleasure, photography and wildlife viewing. This EMU is classified as Roaded Natural with no significant visual concerns that could arise from vegetation management. See Recreation Map in [Appendix A](#).

ENVIRONMENTAL EFFECTS

The geographic boundary for the effects on recreation resources encompass both analysis area and the entire view shed as viewed from the transportation system. Timelines for measuring the effects on the recreation values are the immediate user experience and the values and memories created for a lifetime. The user experiences created or affected by the proposed management activities would be from short term to possibly indefinitely.

PROPOSED ACTION

A **direct effect** of the Proposed Action would be during harvest operations. The evidence of human activity in the area would increase due to the activity associated with logging. This activity may temporarily displace hunters and other dispersed users. Following harvest, logging activity and equipment would leave the area and disruption would cease.

In the future, prescribed burning could temporarily limit the activities that would occur on these areas. Initially, prescribed burning may produce ash, which sometimes disturbs hunting dogs. However, this ash would settle after 2 or 3 rains. The slash produced in logging areas could impede foot travel in the areas for 2 or 3 years until the slash decomposed. The habitat work proposed in this alternative would promote diversity for both game and non-game species, increasing recreational opportunities for hunting and bird watching. **Direct effects** from this alternative would include an increase in hunting and other dispersed recreational use over time as a result of management activities. The Proposed Action proposes both wildlife stand improvements and pond rehabilitation. The direct effect of these actions would be minimal on recreation activities. Herbicide work would temporarily display evidence of increased human activity within *West Haw Creek* due to traffic associated with the herbicide workers. Recreational users would notice negligible impacts on wildlife and vegetation due to the timing of the herbicide application. **Indirectly**, wild game for hunting would be more abundant due to new growth and increased browse as a result of timber management and prescribed burning activities. Hunting and dispersed camping would continue to occur and most likely increase.

CUMULATIVE EFFECTS

Cumulatively, an increase in dispersed recreational use would be expected to occur. Proposed management activities would result in improved access to the general forest, enhanced wildlife habitat, and a more open forest appearance.

NO ACTION ALTERNATIVE I

Under this alternative, there would be no additional management activity occurring within the project area. Only routine maintenance would continue. **Indirect effects** include a reduction in the number of dispersed recreation users due to vegetative growth having a negative impact on access and wildlife encounters. **Indirectly**, wild game would not be as abundant due to no timber harvesting or prescribed burning. The result would be a reduction in hunting activity within the project area.

CUMULATIVE EFFECTS

Cumulatively, no timber harvesting or prescribed burning would result in an unhealthy forest becoming susceptible to insects and disease while allowing the understory and midstory to become dense where openings or gaps occur. Dispersed recreational use would eventually decrease because of an overgrown condition and eventually become stagnant.

NO HERBICIDE ALTERNATIVE II

Direct, indirect, and cumulative effects are estimated to be similar to the effects of the Proposed Action, without the increased human activity associated with an herbicide application.

NO ROAD CONSTRUCTION ALTERNATIVE III

The effects of this alternative would be the same as the Proposed Action except any effects resulting from road construction would not occur. Because fewer acres would be harvested, the extent of logging effects would be reduced.

VISUAL RESOURCES

Present Conditions

West Haw Creek is a very accessible area of the forest, located on the Oklahoma border, north of the community of Black Fork and southwest of Waldron, Arkansas. The rolling topography and gentle slopes are visible from FDR 32, 32A, 32E, 42, and 80.

The Forest Service utilizes the Scenery Management System (SMS) to evaluate land management activities in the context of the integration of benefits, values, desires, and preferences regarding aesthetics and scenery. The SMS provides an overall framework for the orderly inventory, analysis, and management of scenery. The system applies to every acre of national forest and national grassland administered by the Forest Service and to all Forest Service activities. Scenic integrity generally refers to the degree of intactness or wholeness of the landscape character. Human alteration can increase, lower, or maintain the scenic integrity of a landscape. The existing landscape character being viewed is the frame of reference for measuring scenic integrity and the potential effects of management activities. Scenic integrity levels for the Ouachita National Forest include Very High, High, Moderate, and Low. During the recent revision process for the Revised Forest Plan, a broad overview of Forest scenery resource was developed by establishing Forest-wide Scenic Integrity Levels using Geographic Information System (GIS) technology (USDA Forest Service 2005B, pp. 260-267). Scenic Integrity Levels establish the objective for management of the scenery resource and is called the Scenic Integrity Objective (SIO). (SIO map is in project file.)

The Western Arkansas Valley Mountains Subsection: The project area lies within the Western Arkansas Valley Mountains (Subsection 231Gb; USDA Forest Service 2005b, pp. 24-25, 262). The characteristic features of this subsection consist of low to moderate mountains and ridges interspersed with narrow to wide valleys. Forested slopes covered in shortleaf pine-oak are visible from the valley bottoms. Elevations range from 560 to almost 1,000 feet. Once within the forest, vegetation density prevents most views beyond the immediate foreground with occasional views beyond the foreground. Existing forest types are mainly shortleaf pine and oaks. The resulting vegetation form is evergreen needle-leaved forest with pockets of broad-leaved forest. These mixed pine-hardwood forests draw numerous tourists to the region during two seasons of the year: the spring, when white dogwood blossoms seem to cover the hills, and the fall, when the mountains blaze with color.

The existing landscape character for the project area consists of moderate to gently rolling hills and lower elevation mountains with long ridges interspersed by narrow to wide valleys positioned in an east-west trending direction. Elevations generally range from 500-1500 ft. Above Sea Level (ASL). The visitor/viewer within the project area perceives a natural landscape having some evidence of human disturbance. Natural disturbances such as fire, wind, pests, or disease have not contributed significantly to vegetative patterns. Understory species include bushes, vines, briars, grasses, and various hardwoods (oak, hickory, dogwood, gum, maple, etc.). Generally forest roads in the project area follow the natural terrain. Users in this portion of the Forest include sightseers engaging in pleasure driving, dispersed camping, hunting and off Highway Vehicle (OHV) riding. Existing recreation use in this area is low to moderate and fits most of the experiences described as the Forest's niche: sightseeing, equestrian use, hunting and nature-viewing. The Scenic Integrity Objective for the majority of this project area is ***moderate***. See map below. Scenic opportunity and seen areas are somewhat limited within the project area. Most of the forest is of a closed-in view shed, meaning that vistas are limited or not present, and trees and understory are normally of such density that the seen area is normally limited to the foreground.

ENVIRONMENTAL EFFECTS

The geographic boundary for the effects on the visual resources encompasses both the foreground viewshed and areas outside the analysis area that would be viewed from forest development roads. Timelines for measuring the effects on the visual resources are immediate, during planned management activities. Any vegetation manipulation techniques would be evident, to varying degrees, for decades. Analysis strategies include, but are not limited to, special techniques, modeling and evaluating all planned vegetation management and soil disturbing proposals.

PROPOSED ACTION

The scenic resource is affected by management activities that alter the appearance of what is visible in the landscape. Short-term scenic effects are usually considered in terms of degree of visual contrast with existing or adjacent conditions that result from management activity. The scenic landscape can be changed over the long-term or cumulatively by the alteration of the visual character. Management activities that result in visual alterations inconsistent with the assigned SIO, even with mitigation, affect scenery. Management activities that have the greatest potential of affecting scenery are road construction, large-scale and long-term vegetation management, insect and disease control, utility rights-of way, and mineral extraction. Other management activities that also can impact the scenic resource at a lesser degree are threatened and endangered (T&E) species habitat management, prescribed burning, fire suppression, land exchange, old growth forest management, recreation, administrative site facility construction, and wildlife management (USDA Forest Service 2005b, pp. 264, 265). **Direct effects** to the scenic character of the forest would occur largely in the form of changes in forest vegetation resulting from proposed timber harvest, prescribe burning, site preparation, reforestation treatments (including possible herbicide release), pond rehabilitation, temporary wildlife openings, and wildlife stand improvement activities (also with possible herbicide application). A **direct effect** would be a loss in vegetative screening. An **indirect effect** of timber harvest activity will be enhanced viewing depth and contrasting tree density. Harvest treatment will also result in a **direct effect** of logging or thinning residue (slash) such as treetops and branches accumulating on the ground. Slash will eventually decay resulting in reduced long-term effect to scenery. Travel-ways within the project area are dominated by a mostly closed view of the forest. Closely spaced trees and dense midstory and/or understory vegetation greatly limit depth of view. Providing some diversity of visibility, with the development of more open forest conditions, was considered by the ID Team to be consistent with Scenic Integrity Objectives.

Prescribed burning will temporarily reduce the amount of understory vegetation, allowing for greater viewing depth into the forest. Burning would create the **direct effect** of a charred appearance on tree trunks and the forest floor. These effects would diminish in three to six months due to re-growth of vegetation on the forest floor, as well as natural leaf and needle shedding. This “green up” would restore a more natural appearance in the landscape. Proposed stand improvements through release methods (including herbicide release) would result in a short-term direct effect on visual quality as the vegetation becomes brown and dies off. Over time the visual quality would increase as the leaves drop to the forest floor and decompose or are removed during prescribed burning as mentioned above. By implementing the proposed management activities it is expected that there will be an increase in the vigor or health of the forest that will reduce the **direct and indirect** negative effects to visual quality that could result in an alteration of the landscape due to tree damage or mortality caused by insects and disease. Because some of the management treatments target hardwoods, an **indirect effect** could be a loss of spring and fall colors. Changes in color and texture could possibly result from exposed soil in roads and skid trails; however this indirect effect should be expected to be short-term considering expected revegetation from natural conditions and/or restoration measures. With the implementation of controlled (prescribed) burning the potential **direct and indirect** detrimental effects to visual quality resulting from catastrophic fire are diminished. Prescribed burning substantially diminishes the potential for crown fires that could result in dead overstory trees and large burn scars on remaining live trees. Low intensity prescribed fires tends to create short-term color change.

CUMULATIVE EFFECTS

No cumulative effects are expected from implementation of this alternative because there are no other known or expected activities within the geographic bounds and timelines that would affect visual quality. The changes in the landscape would continue to appear natural to the observer.

NO ACTION ALTERNATIVE I

By not implementing the proposed activities, this Alternative would not alter scenic quality. Mature and over-mature trees would decay and die creating contrasts in form, line and texture. All changes in this landscape would appear natural to the observer. Scenic integrity may be compromised by not implementing harvest activities in this area. Densely stocked stands result in reduced vigor or health, which cause susceptibility to insects and disease. Infestations could result in tree death, negatively impacting visual quality. In the event of a catastrophic wildfire, crown fires, or those that sweep through the

canopy, would create a visible change to the landscape. Snags would appear as black, brown, and gray “skeletons”. Other trees would show burn scars. Burn scars on tree trunks or “torched trees” remain visible for a long time. Understory vegetation would quickly green up, however the standing burned vegetation would remain.

CUMULATIVE EFFECTS

No cumulative effects are expected from implementation of this alternative because there are no other known or expected activities within the geographic bounds and timelines that would affect visual quality. The changes in the landscape would continue to appear natural to the observer.

NO HERBICIDE ALTERNATIVE II

Direct, indirect, and cumulative impacts are expected to be similar to those of the Proposed Action without the effects of an herbicide application.

NO ROAD CONSTRUCTION ALTERNATIVE III

The effects of this alternative would be the same as the Proposed Action except any effects attributable to road construction would not occur. Because fewer acres would be harvested, the extent of logging effects on scenic quality would be reduced.

HERITAGE RESOURCES

Present Conditions

Known Cultural Resources. Thirty-Three (33) archeological sites have been identified in or near the project area as a result of previous cultural resources inventory surveys. Based on scientific evaluation and consultation with the SHPO and Tribes, 27 of the sites were determined to be ineligible for listing in the National Register of Historic Places. Six (6) of the sites will require more investigation to formally determine their eligibility and will need to be protected.

Site Locations Not Yet Known. Cultural resource surveys may not be complete for certain activities because additional planning may be required prior to implementation. These activities include, but are not limited to:

- Burn boundary and fireline construction locations
- Temporary roads, skid trails, and log landings outside areas already surveyed
- Road reconstruction, maintenance, conversion, or decommissioning activities involving ground disturbance occurring outside areas already surveyed

These areas will be surveyed and regulatory and tribal consultation completed prior to implementation.

ENVIRONMENTAL EFFECTS

The scope of the analysis for potential effects to cultural resources includes the entire *West Haw Creek* Project Area (see Chapter 1 and [Appendix “A”](#) maps) and considers the proposed activities within treatment areas (see Chapters 1 and 2), as well as access to these areas.

An effect to a cultural resource is the “...alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register.” (36 CFR 800.16(i)) Any project implementation activity that has potential to disturb the ground has potential to directly affect archeological sites, as does the use of fire as a management tool. Specific activities outlined in the *West Haw Creek* Project that have potential to directly affect cultural resources include timber harvesting and associated log landings, skid trails, and temporary roads, prescribed burning and associated fire line construction, road maintenance or reconstruction where ground disturbance takes place outside existing right-of-way area, and pond construction for wildlife water source.

Proposed activities that do not have potential to affect cultural resources, and therefore, are not considered undertakings for purposes of this project include: Non-commercial thinning, timber stand improvements, on-going maintenance of existing Forest roads or reconstruction of previously surveyed roads where ground disturbance does not take place outside existing road prisms and existing drainage features, rehabilitation/closure of temporary roads, log landings, and skid trails using non-ground disturbing methods, road decommissioning using non-ground disturbing methods, and non-native invasive plant species control using non-ground disturbing methods.

In general, proposed Project activities have the potential to affect cultural resources by encouraging increased visitor use to those areas of the Forest in which cultural resources are located. Increased visitor use of an area in which archeological sites are located can render the sites vulnerable to both intentional and unintentional damage. Intentional damage can occur through unauthorized digging in archeological sites and unauthorized collecting of artifacts from sites. Unintentional damage can result from such activities as driving motorized vehicles across archeological sites, as well as from other activities, principally related to dispersed recreation, that lead to ground disturbance. Effects may also include increased or decreased vegetation on protected sites due to increased light with canopy layer reduction outside of the protected buffer.

PROPOSED ACTION AND NO HERBICIDE ALTERNATIVE II

Direct and Indirect Effects

Proposed access changes (see §2.6.1.1, §3.4.8, and Road Status and Motor Vehicle Use Map, Appendix “B”), soil restoration work (see §3.4.2 and §3.4.3), and opening of forested areas from timber harvest (see maps, [Appendix B](#)) can impact cultural resources. Surface artifacts or features may be exposed, disturbed or removed due to increased access and visibility.

Project components that have potential to directly affect the archeological sites include primarily timber, prescribed fire, road management, and some wildlife management activities. Adverse effects to cultural resources resulting from *West Haw Creek* Project activities could be avoided provided site avoidance and site protection measures are properly applied to the nine historic properties (see Chapter 2, technical requirements/design criteria). In that instance, Project activities would not be expected to adversely affect archeological sites.

Cumulative Effects

As noted in Section 2.7 (Other Past, Present, and Reasonably Foreseeable Actions), Forest Service activity in the Project Area and adjacent watershed areas has not been extensive. Project scoping and analysis have not disclosed any definitive plans for use on non-national forest lands in the Project Area. Cumulative effects to cultural resources are not expected to occur. Known or discovered historic properties will be monitored to ensure continued protection.

NO ACTION ALTERNATIVE I

With no change in current management activities and direction, adverse effects (and the potential for them) on a number of the archeological sites may continue. With the No Action Alternative, historic properties likely would continue to degrade. Where sites exist in currently accessible areas, such as along roads, there is potential for being impacted, disturbed, or vandalized due to accessibility. There would be no change in effects from the current condition, and the potential threat to integrity of cultural resources would remain unchanged.

CUMULATIVE EFFECTS

Cumulative effects are not expected to occur; there are no past or present actions affecting cultural resources, nor is there future actions planned that would affect cultural resources.

NO ROAD CONSTRUCTION ALTERNATIVE III

The effects of this alternative would be the same as the Proposed Action except any effects attributable to road construction would not occur. Because fewer acres would be harvested, the extent of logging effects on heritage resources would be reduced.

CLIMATE CHANGE

Present Conditions

Forests play a major role in the global carbon cycle by storing carbon in live plant biomass (approximately 50% of dry plant biomass is carbon), in dead plant material, and in soils. Forests contain three-fourths of all plant biomass on earth, and nearly half of all soil carbon. The amount stored represents the balance between absorbing CO₂ from the atmosphere in the process of photosynthesis and releasing carbon into the atmosphere through live plant respiration, decomposition of dead organic matter, and burning of biomass (Krankina and Harmon, 2006).

Through the process of photosynthesis, carbon is removed from the atmospheric pool. About half the carbon absorbed through photosynthesis is later released by plants through respiration as they use their own energy to grow. The rest is either stored in the plant, transferred to the soil where it may persist for a very long time in the form of organic matter, or transported through the food chain to support other forms of terrestrial life. When plants die and decompose, or when biomass or its ancient remains in the form of fossil fuels are burned, the original captured and stored carbon is released back to the atmosphere as CO₂ and other carbon-based gases. In addition, when forests or other terrestrial ecosystems are disturbed through harvesting, conversion, or natural events such as fires, some of the carbon stored in the soils and organic matter, such as stumps, snags, and slash, is oxidized and released back to the atmospheric pool as CO₂. The amount released varies, depending on subsequent land use and probably rarely is more than 50% of the original soil store (Salwasser, 2006). As forests become older, the amount of carbon released through respiration and decay can exceed that taken up in photosynthesis, and the total accumulated carbon levels off. This situation becomes more likely as stands grow overly dense and lose vigor. Wildfires are the greatest cause of carbon release from forests. At the global scale, if more carbon is released than is captured and stored through photosynthesis or oceanic processes, the concentration of carbon dioxide (CO₂) builds in the atmospheric pool. However, the greatest changes in forest sequestration and storage over time have been due to changes in land use and land use cover, particularly from forest to agriculture and more recently changes are due to conversions from forest to urban development, dams, highways, and other infrastructure (Malmsheimer et al., 2008).

ENVIRONMENTAL EFFECTS

PROPOSED ACTION

The proposed harvest operations would result in a release of carbon and reduce carbon storage in the forest both by removing organic matter (trees) and by increasing heterotrophic soil respiration. However, much of the carbon that is removed is offset by storage in forest products. Forest management that includes harvesting provides increased climate change mitigation benefits over time because wood-decay CO₂ emissions from wood products are delayed (Malmsheimer et al., 2008). Prescribed burning activities, although a carbon neutral process, would release CO₂, other greenhouse gasses, and particulates into the atmosphere. However, implementing the proposed prescribed burns on a 3 to 5 year cycle would reduce fuel loading and could be expected to reduce fire intensity and severity as well. Indirectly, implementation of the proposed actions would increase the overall health, vitality, and growth within the project area, reduce the susceptibility to insects and disease, as well as reduce fuel accumulations and lower the risk for a catastrophic wildfire from occurring in the project area. This would serve as a way to increase carbon storage within the project area and mitigate carbon accumulation in the atmosphere.

CUMULATIVE EFFECTS

As GHG emissions and carbon cycling are integrated across the global atmosphere, it is not possible to determine the cumulative impact on global climate from emissions associated with this project or any number of projects. It is not expected

that the effects of this project or multiple projects can be specifically attributed the cumulative effects on global climate change.

NO HERBICIDE ALTERNATIVE II

The direct, indirect, and cumulative effects of Alternative II are the same as those disclosed above for the Proposed Action.

NO ACTION ALTERNATIVE I

No management activities would occur under this alternative, therefore no direct effects on GHG emissions and carbon cycling would occur. Because no management activities would take place under this alternative, carbon would continue to be sequestered and stored in forest plants, trees, (biomass) and soil. Unmanaged, older forests can become net carbon sources, especially if probable loss due to wildfires is included (Malmshiemer et al., 2008). In the absence of prescribed fire, fuel loadings would continue to increase and accumulate on the forest floor. In the event of a wildfire, fuel loading would be higher, increasing the risks of catastrophic damage to natural resources. This would result in a large release of GHG and carbon into the atmosphere. By deferring timber harvest activities, the forests would continue to increase in density. Over time this could pose a risk to density dependent mortality, insects, and disease. This could result both in a release of carbon from tree mortality and decomposition as well as hinder the forests ability to sequester carbon from the environment because live, vigorous stands of trees retain a higher capacity to retain carbon.

CUMULATIVE EFFECTS

As GHG emissions and carbon cycling are integrated across the global atmosphere, it is not possible to determine the cumulative impact on global climate from emissions associated with this project or any number of projects. It is not expected that the effects of this project or multiple projects can be specifically attributed the cumulative effects on global climate change.

NO ROAD CONSTRUCTION ALTERNATIVE III

The effects of this alternative would be the same as the Proposed Action except any effects attributable to road construction would not occur. Because fewer acres would be harvested, the extent of logging effects (both positive and negative) on climate change would be reduced.

OTHER

Civil Rights, Consumers, Minority Groups, and Women

Impacts from the proposed actions are not anticipated on civil rights. Actions would impact consumers, minority groups, and women in the same manner as all other groups. .

Federal, State or Local Laws

There are no known Federal, State, or Local Laws that are being violated in the project area from the actions of the Forest Service.

CHAPTER 4 ID TEAM MEMBERS AND PRIMARY AUTHORS*

District Ranger AJ Brigance
Timber Management Assistant Scott Saunders*
Wildlife Biologist Jason Garrett*
Recreation Assistant John Strom*
Archeologist Lexie Rue-Harris*
Silviculturist Timothy Gill*
Environmental Protection Assistant Donna Reagan (NEPA)*
Fire Specialist Tim Nutley*
Forest NEPA Planner Lisa
Cline

Wildlife Biologist Warren Montague
Wildlife Biologist BJ Stephens
Forester Nicole James
Heritage Resource Technician Raymond McGrath
Heritage Resource Technician Marilyn Huddleston
Soil Scientist Jeff Olson
USDA Forest Service Region 8 Air Quality
Specialist Melanie Pitrolo
Natural Resource Manager-Mena/Oden Ranger
District - Jade Ryles

CHAPTER 5 PERSONS AND AGENCIES CONTACTED AND/OR CONSULTED

List of Agencies Consulted

Fish and Wildlife Service
Arkansas Historic Preservation Office
Osage Nation
Caddo Nation
Quapaw Tribe of Oklahoma
Choctaw Nation
Chickasaw Nation

List of Contacts - Mailed Hardcopy

Jerry Williams Howard Robinson Richard A. Gordon Bob Waid

List of Contacts – Emailed Electronically through Outlook

Richard Artley
Stephanie Burchfield, Arkansas Department of Health

Jeremy Everitts, NWTF
Gene Miller, NWTF

Derek Alkire, NWTF
Darel Williamson

List of Contacts - Emailed Electronically through GovDelivery

439559050@qq.com	leonmitchell67@hotmail.com	williambrighamadairocket2020@yahoo.com
adamschan88@outlook.com	lidiaelen373@gmail.com	mbahdanielwhitehouseusdoegovprog@yahoo.com
mjafhvac@gmail.com	lillie0227@gmail.com	mbahdanielwhitehouseusdoemgovpro@yahoo.com
mmbechler@gmail.com	lisajabber1@yahoo.fr	mbahdanielwhitehouseusoeeregopr@yahoo.com
lcline@fs.fed.us	luwiss.morris@gmail.com	mbahdanielwhusadepartofinteriorp@yahoo.com
amandafyffe81@gmail.com	malualdavid230@yahoo.com	mr.muhammadbukharin02@hotmail.com
anas17121991@yahoo.fr	marvinharris@yahoo.com	rehemenwaygovernmentandmedical@gmail.com
aqk6@cdc.gov	masseyrocks199@gmail.com	barrmaryjokosonassociation@hotmail.com
mfcnb@outlook.com	matt.mcnaair@arkansas.gov	deepaksharmaseoservices77@hotmail.com
arnulfovaladez@inbox.ru	max.a.freed@outlook.fr	pankajmanmohansadaphal@gmail.com
atmcard69@outlook.com	charlesanestor@gmail.com	erwin.vaneyndhoven@advalvas.be
badjacks@att.net	cindy@arkansasheritage.org	spidermanspiderman101@yahoo.com
barricuda50@outlook.com	mercytime4@yahoo.fr	johannes.schmaltz@schmaltz-partner.de
mrdauid.gates@mail.ru	minnesota.paulwhite@net-c.es	ministryoffinance.org@hotmail.com
baseball1965@acanac.net	mr.ericleonard24@outlook.com	nurfahmie86.76.na.na76@gmail.com
beatles2015@acanac.net	mr.johnfkerry@gmail.com	office.payment2015@yandex.com
bedward1942@hotmail.com	mmrsmrschris05@gmail.com	clarkechambers.associateshc@mail.ru
bennywinthrope@gmail.com	myatmcard67@gmail.com	charlesdriggers.usa@outlook.com
bennywinthrope@live.com	nasirhakeem155@gmail.com	ari.satinoff@wheelermagnet.com
bevken86@gmail.com	nastyjoanne@yahoo.com	shankarlalldhakar8094@gmail.com
bk19875@bkalabama.com	nigeriannpc1@gmail.com	ubakassitempleofsolution@live.com
bpell@fs.fed.us	ny-ny-newyork@hotmail.com	vicepresidentofnigeriang@gmail.com
bradfordbill@live.com	dhl-courierplc@outlook.com	westernuionheadquarter@gmail.com
cguy@shr2.k12.mo.us	djjohnplayerspecial@gmail.com	u.sdepartmento23@yahoo.com
okzonk@gmail.com	drfrankwhiteclap@yahoo.com	johnsoncontrols.com@gmail.com
onuclaims1@qq.com	farhaaadsaaami1@hotmail.com	jeanne@newbeginninglandscape.com
paulgreg720@gmail.com	patrick@premierkings.com	ahmedalhassan76@yahoo.com
peters5668@gmx.de	paulkhumalo5060@gmail.com	aliabdualamterhouni@gmail.com
cold-war@safe-mail.net	piechotas@hotmail.com	allboutcompliance@outlook.com
crimelady2004@yahoo.com	rajeshnair@cvsearchinc.com	geral@tempodeviagem.com.pt
cwo518@gmail.com	ramansour@hotmail.com	gina.loanlenders01@gmail.com
czmek@fs.fed.us	randy.easley@carkw.com	info@djjohnplayerspecial.com
dalkire@nwtf.net	randy.schorn@sbdinc.com	paulkhumalo5066@outlook.com
rh8600@163.com	rasheen75@outlook.com	hebertchris0177@yahoo.fr
rickyj002@gmail.com	horseladecathy@yahoo.com	tonokuuhi@gmail.com
smbs@aol.com	revjohnson24@yahoo.co.nz	western_union03@hotmail.com
drebidighe101@gmail.com	igotmymtv2005@gmail.com	wolfgm@gmail.com
figarinstor@gmail.com	rhondagail777@gmail.com	wyattwinefield@gmail.com
dromar202@hotmail.com	jaimie.brayanjr@yahoo.com	yurikarmidzhanov@gmail.com
dzollner@tnc.org	robin.flett@yahoo.co.uk	jmondragon4795@yahoo.com
earms1@gmail.com	ronetterollins26@yahoo.com	ionutboss29064@yahoo.com
earthpeace7@msn.com	evettetippett@yahoo.com	james_petters1@yahoo.com
edsue.hawkins@gmail.com	facebooklott@outlook.com	findingfathers124@gmail.com
		te1229t@yahoo.com

edwardlocher@gmail.com
enterprize914@gmail.com
eriftiya@gmail.com
trulyjudy@msn.com
srini_red@yahoo.com
gbell50@msn.com
sasha2450@yandex.ru
gibandella@hughes.net
glee726@outlook.com
gmiller@nwtf.net
ryan04416@gmail.com
salam2@fasogroup.net
hwg91325@gmail.com
yum1@cdc.gov
imluna47@yahoo.com
info011@qq.com
info@kiyagroup.com
infowallyn@gmail.com
isorisnot187@gmail.com

samashdincc@gmail.com
samrithmeng82@yahoo.com
samrithmeng88@yahoo.com
scheuermannb@bol.com.br
sean@codymedia.com
seyedan.sadra@gmail.com
fisherdavid627@yahoo.com
sharkjive132@yahoo.com
sherman1157@gmail.com
sjaramillo_89@hotmail.com
sjdlrn@hotmail.com
JSKUSACORP@GMAIL.COM
sparrowfeather64@gmail.com
joshuaalaoma1@gmail.com
spiro.antzoulatos@gmail.com
jeremy.fancher@imba.com
steven@codymedia.com
support@seancody.com
groundround@sbcglobal.net

tg00125@aim.com
the.rrrs@gmail.com
jeff.a.ansley@gmail.com
jeveritts@nwtf.net
jewlzmccq@gmail.com
jimmiej48@live.com
jjpravlik@gmail.com
jlij2@cdc.gov
joanne4919@att.net
vcharmon@ou.edu
ve5wef@gmail.com
joshspitzer@me.com
zakiahommani@live.fr
zlocko83@live.com
jsturgeson@fs.fed.us
kenszaku@gmx.com
kutilin.dan@yandex.ru
kvazer7@gmail.com
lapaz.bo@gmail.com

CHAPTER 6 LITERATURE CITED

Arkansas Forestry Commission. 2002. Best Management Practices for Water Quality Protection.

Beasley, R.S., E. L. Miller and E. R. Lawson. 1987. Chemical Properties of Soils and Streams in Natural and Disturbed Forest Ecosystems in the Ouachita Mountains. Publication No. 132. Technical Completion Report Research Project G-1212-02. Arkansas Water Resources Research Center.

Clingenpeel, J. Alan. 1989. Above and Below Storm Sampling BMP Effectiveness FY 1989 Monitoring Results. Internal report on file at the Ouachita National Forest, Supervisors Office, Hot Springs. AR. 2 pages.

EPS-HDT. 2014. Economic Profile System-Human Dimensions Toolkit. (<http://headwaterseconomics.org/tools/economic-profile-system>)

Garrett, Jason. February, 2016. Biological Evaluation of Environmental Assessment for West Haw Creek EMU.

Guynn, D. C., Guynn, S. T., Wigley, T. B. and Miller, D. A. (2004), Herbicides and forest biodiversity—what do we know and where do we go from here?. Wildlife Society Bulletin, 32: 1085–1092. doi

Hardy, Colin C.; Ottmar, Roger, D; Peterson, Janice L., Core, John E., and Seamon, Paula. 2001. Smoke Management Guide for Prescribed and Wildland Fire. National Wildfire Coordination Group. 226 p. <http://www.nwcg.gov/pms/pubs/SMG/SMG-72.pdf>

Krankina O.N. and Harmon M.E. 2006. Forest, Carbon, and Climate Change: A Synthesis of Science Findings. A Project of Oregon Forest Resources Institute, Oregon State University College of Forestry, and the Oregon Department of Forestry. pp. 79-85.

Lacki, M. J., J. P. Hayes, and A. Kurta (eds.). 2007. Bats in Forests: Conservation and Management. Johns Hopkins University Press, Baltimore, Maryland, 329 pp.

Lippe, M.V. and I. Kowarik. 2006. Long-distance dispersal of plants by vehicles as a driver of plant invasions. Conservation Biology 21: 986-996.

Malmsheimer, R.W., Heffernan, P., Brink, S., et al. "Forest Management Solutions for Mitigating Climate Change in the United States". Journal of Forestry. April/May 2008. pp 141-156.

Perry, Thill, & David Jr., 2008 Summer Roosting by Adult Male Seminole Bats in the Ouachita Mountains, Arkansas

Perry, R.W. and R.E. Thill. 2007. Roost selection by male and female northern long-eared bats in a pine-dominated landscape. Forest Ecology and Management 247(1): 220- 226. - See more at: <http://forestamerica.org/content/letter-fws-proposed-listing-northern-long-eared-bat-endangered-species-midwest-and-southeast#sthash.2pXMhnwe.dpuf>

Ryles, J. 2013. East Fork Stream Monitoring 2013. Unpublished report on file at Ouachita NF, Poteau/ Cold Springs Office.

Salwasser, H. 2006. Forest, Carbon, and Climate Change: A Synthesis of Science Findings. A Project of Oregon Forest Resources Institute, Oregon State University College of Forestry, and the Oregon Department of Forestry. pp. 3-5.

Sandberg, David V.; Hardy, Colin C.; Ottmar, Roger D.; Snell, J.A. Kendall; Acheson, Ann; Peterson, Janice L.; Seamon, Paula; Lahm, Peter; Wade, Dale. 1999. National strategic plan: Modeling and data systems for wildland fire and air quality. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 60 p.

USDA Forest Service. 1991a. Forest Service Manual 2605.

USDA Forest Service. 1991b. Forest Service Manual 2621.1.

USDA Forest Service. 1994. A Cumulative Effects Analysis of Silvicultural Best Management Practices Using Basin Area Stream Survey Methods (BASS). Ouachita National Forest. Hot Springs AR 71902 Vols. I and II. 129 pages

USDA Forest Service. 2003. A Summary and Analysis of Data pertaining to MIS for the Ouachita National Forest, August 2003.

USDA Forest Service. 2004. National Strategy and Implementation Plan for Invasive Species Management. FS 805, October 2004. 24 pp.

USDA Forest Service, 2005a. Revised Land and Resource Management Plan, Ouachita National Forest, Arkansas and Oklahoma, 2005.

USDA Forest Service, 2005b. Final Environmental Impact Statement (FEIS), Revised Land and Resource Management Plan, Ouachita National Forest, Arkansas and Oklahoma, 2005

USDA Forest Service. 2010. Decision Notice and Finding of No Significant Impact, Salvage of Dead, Down, and/or Damaged Timber on National Forest Lands within Sebastian, Polk, Scott, Logan, and Yell Counties, Arkansas Located on the Poteau-Cold Springs Ranger District

US Environmental Protection Agency (EPA). 1996. AP 42, Fifth Edition, Volume I, Chapter 13: Miscellaneous Sources. Washington D.C. [online]. <http://www.epa.gov/ttnchie1/ap42/>

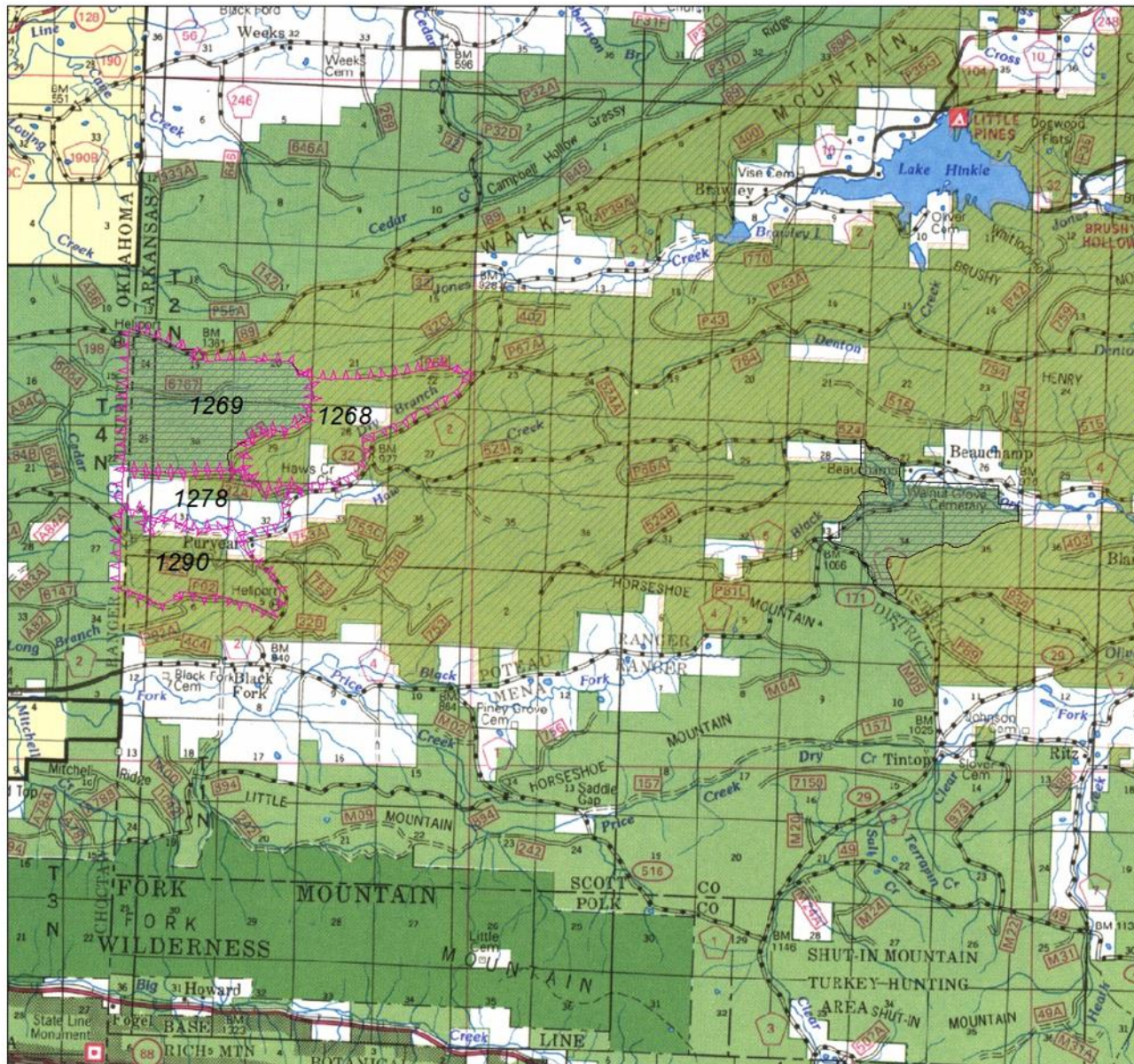
US Environmental Protection Agency (EPA). 2013. The Green Book Nonattainment Areas for Criteria Pollutants. Washington D.C. [online] <http://www.epa.gov/oaqps001/greenbk/index.html>

US Environmental Protection Agency (EPA). 2013. National Emissions Inventory (NEI) Air Pollutant Emissions Trends Data. Washington D.C. [online]. <http://www.epa.gov/ttnchie1/trends/> and ftp://ftp.epa.gov/EmisInventory/2011/2011neiv1_eventfire_countyscc_caphap.zip

US Environmental Protection Agency (EPA). 2014. AirData. Washington D.C. [online] <http://www.epa.gov/airdata/>

US Fish and Wildlife Service. 2013. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List the Eastern Small-Footed Bat and the Northern Long-Eared Bat as Endangered or Threatened Species; Listing the Northern Long-Eared Bat as an Endangered Species

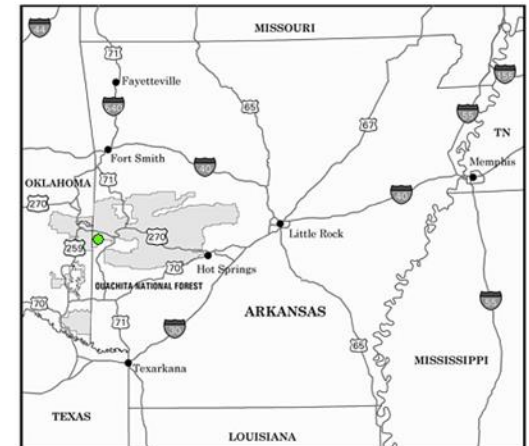
APPENDIX A - MAPS



West Haw Creek Cold Springs Ranger District Ouachita National Forest Location Map

Management Area 22 - Renewal of the Shortleaf Pine/Bluestem
Grass Ecosystem and Red-cockaded Woodpecker Habitat

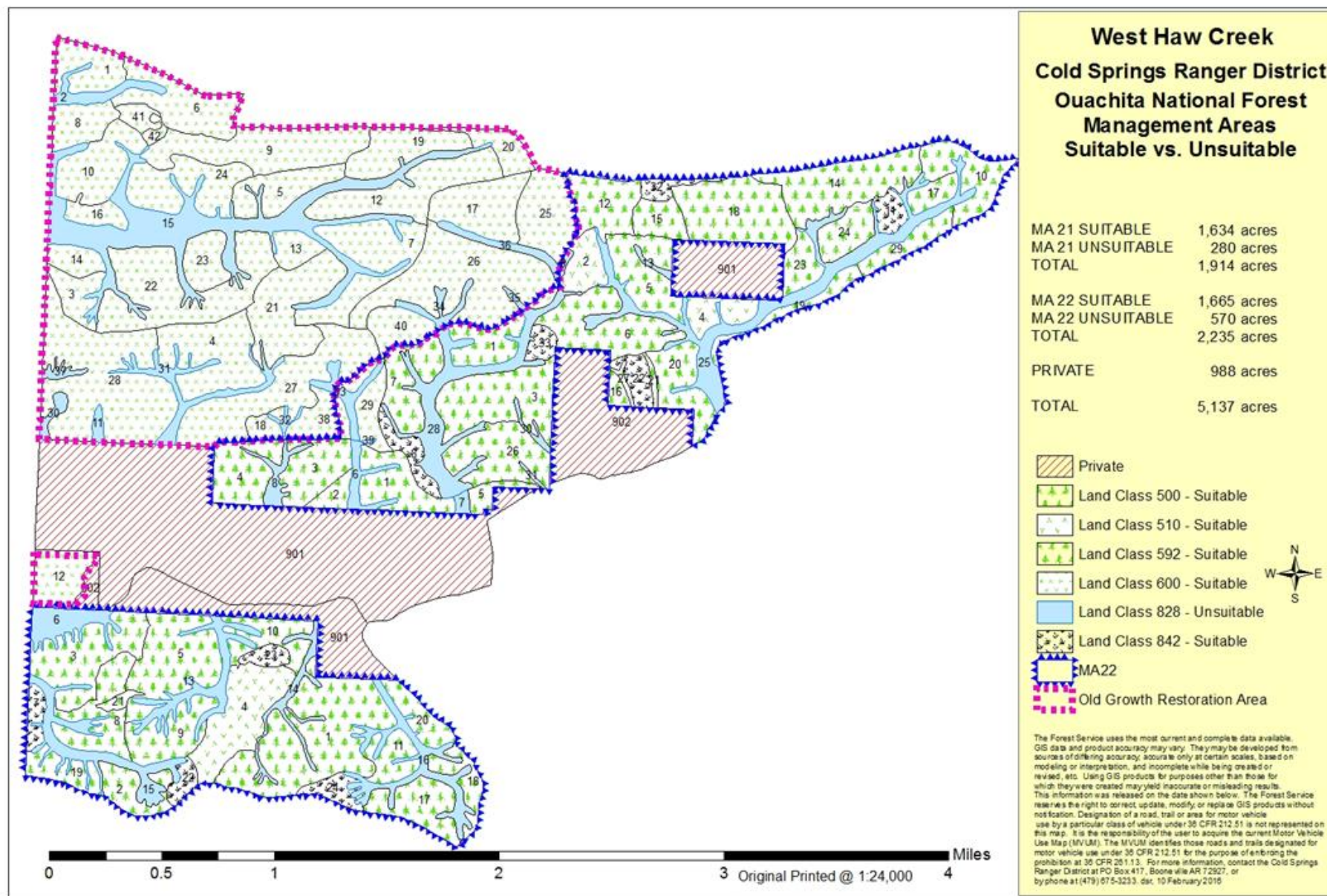
Management Area 21 - Old Growth Restoration

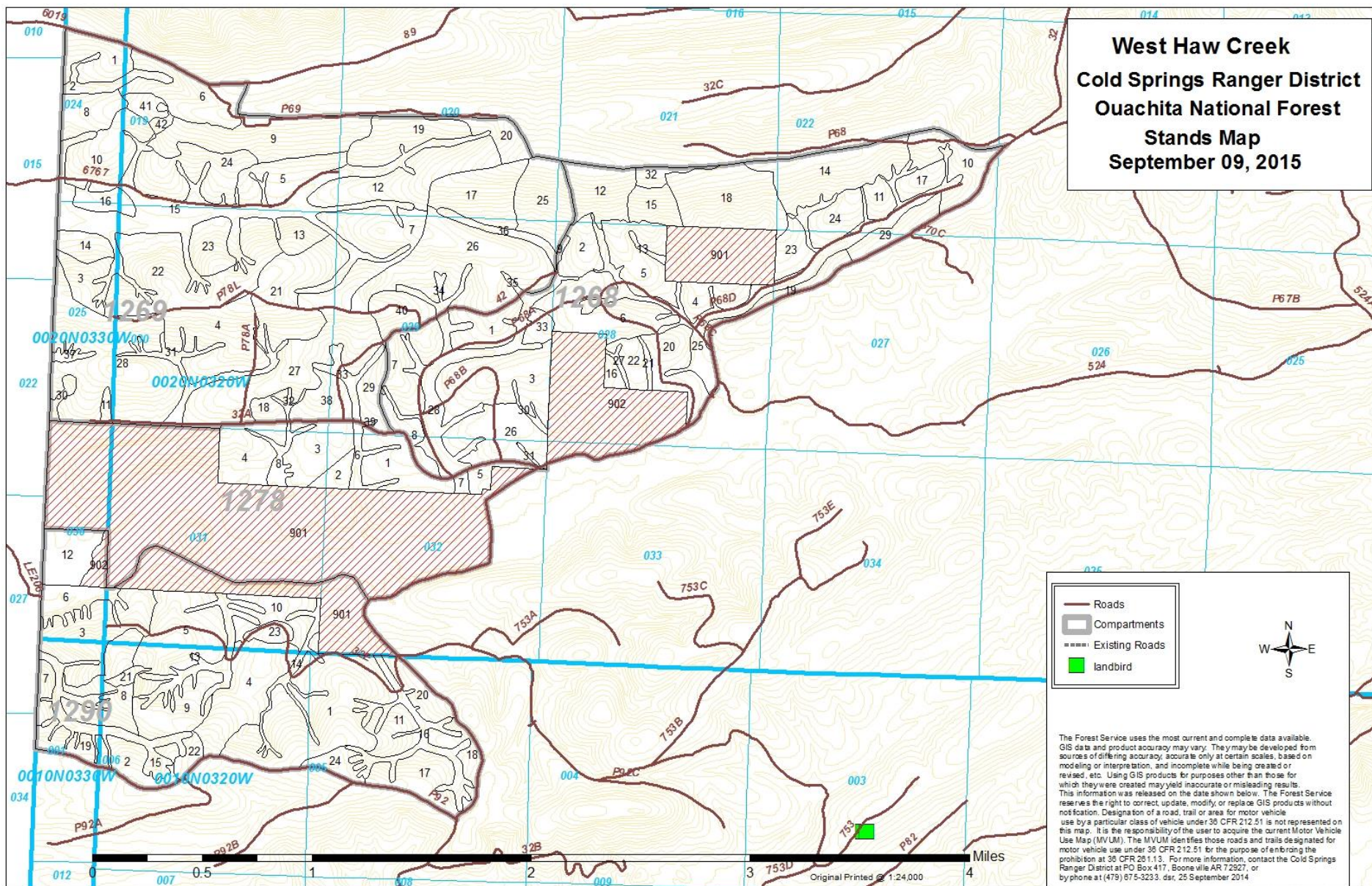


- Project Area
- Management Area 22
- Management Area 21

The Forest Service uses the most current and complete data available. GIS data and product accuracy may vary. They may be developed from sources of differing accuracy, accurate only at certain scales, based on modeling or interpretation, and incomplete while being created or revised, etc. Using GIS products for purposes other than those for which they were created may yield inaccurate or misleading results. This information was released on the date shown below. The Forest Service reserves the right to correct, update, modify or replace GIS products without notification. Designation of a road, trail or area for motor vehicle use by a particular class of vehicle under 36 CFR 212.51 is not represented on this map. It is the responsibility of the user to acquire the current Motor Vehicle Use Map (MVUM). The MVUM identifies those roads and trails designated for motor vehicle use under 36 CFR 212.51 for the purpose of enforcing the prohibition at 36 CFR 261.13. For more information, contact the Cold Springs Ranger District at PO Box 417, Booneville AR 72927, or by phone at (479) 675-3233, dnr, 11 June 2015

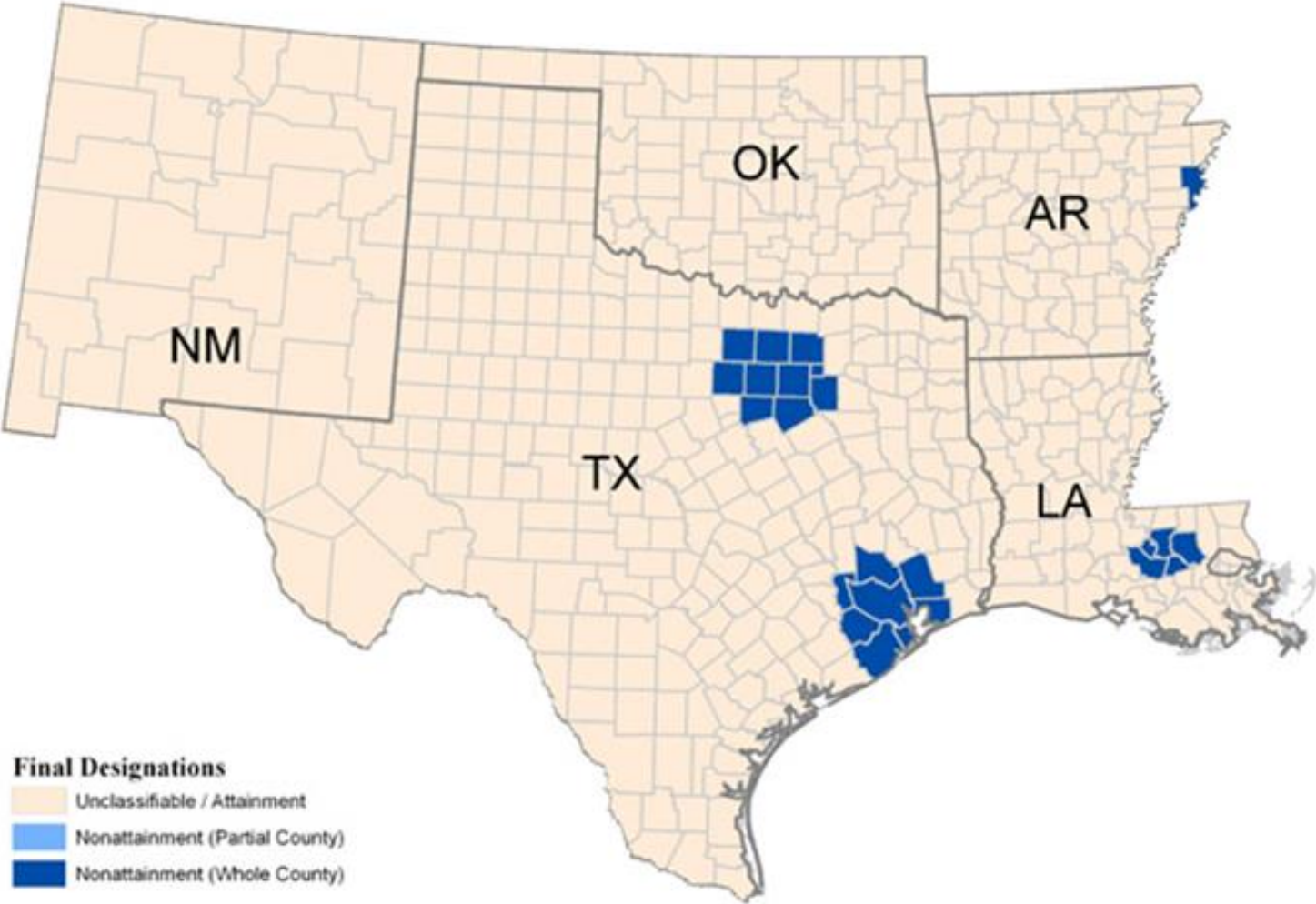


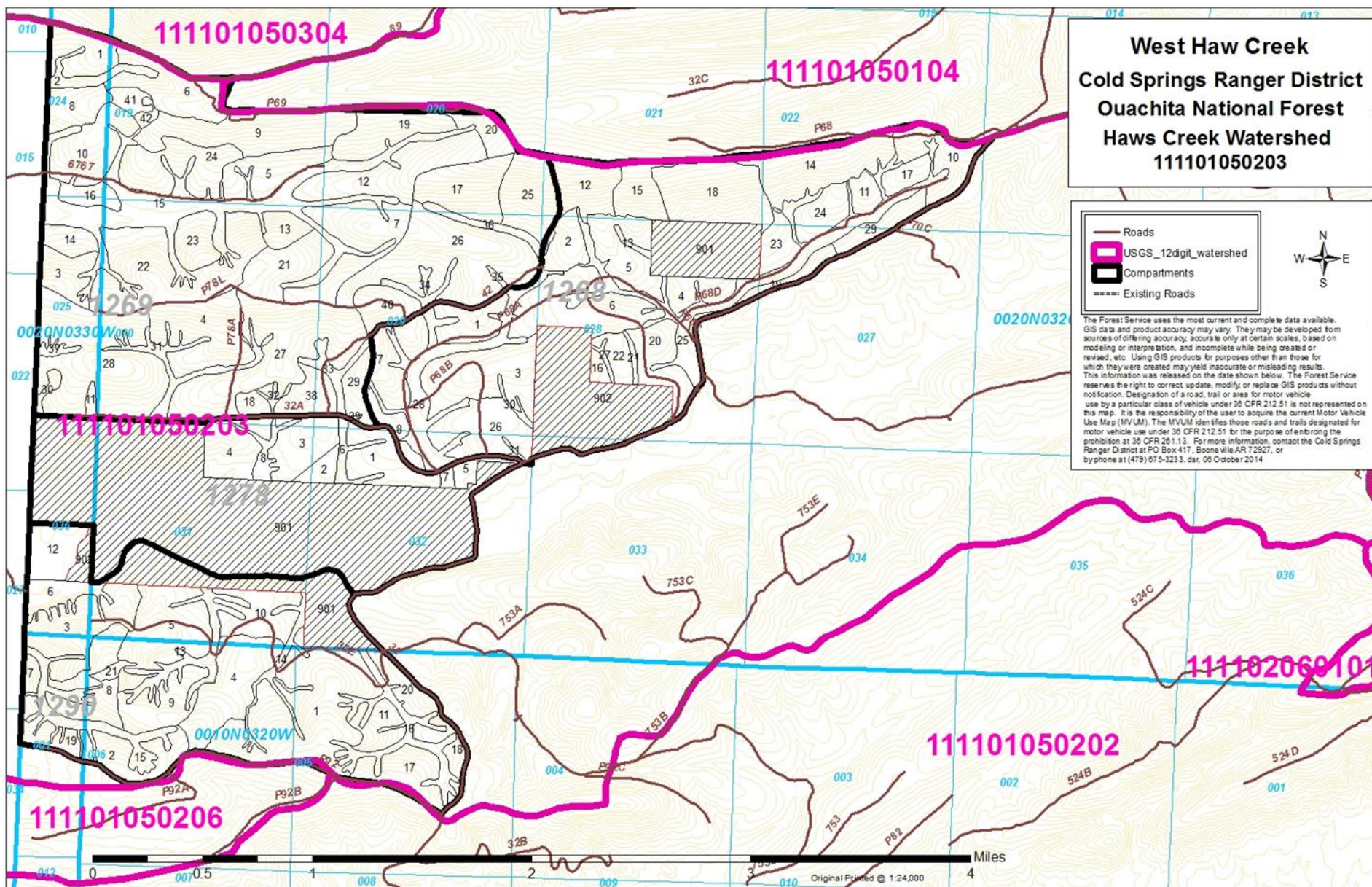


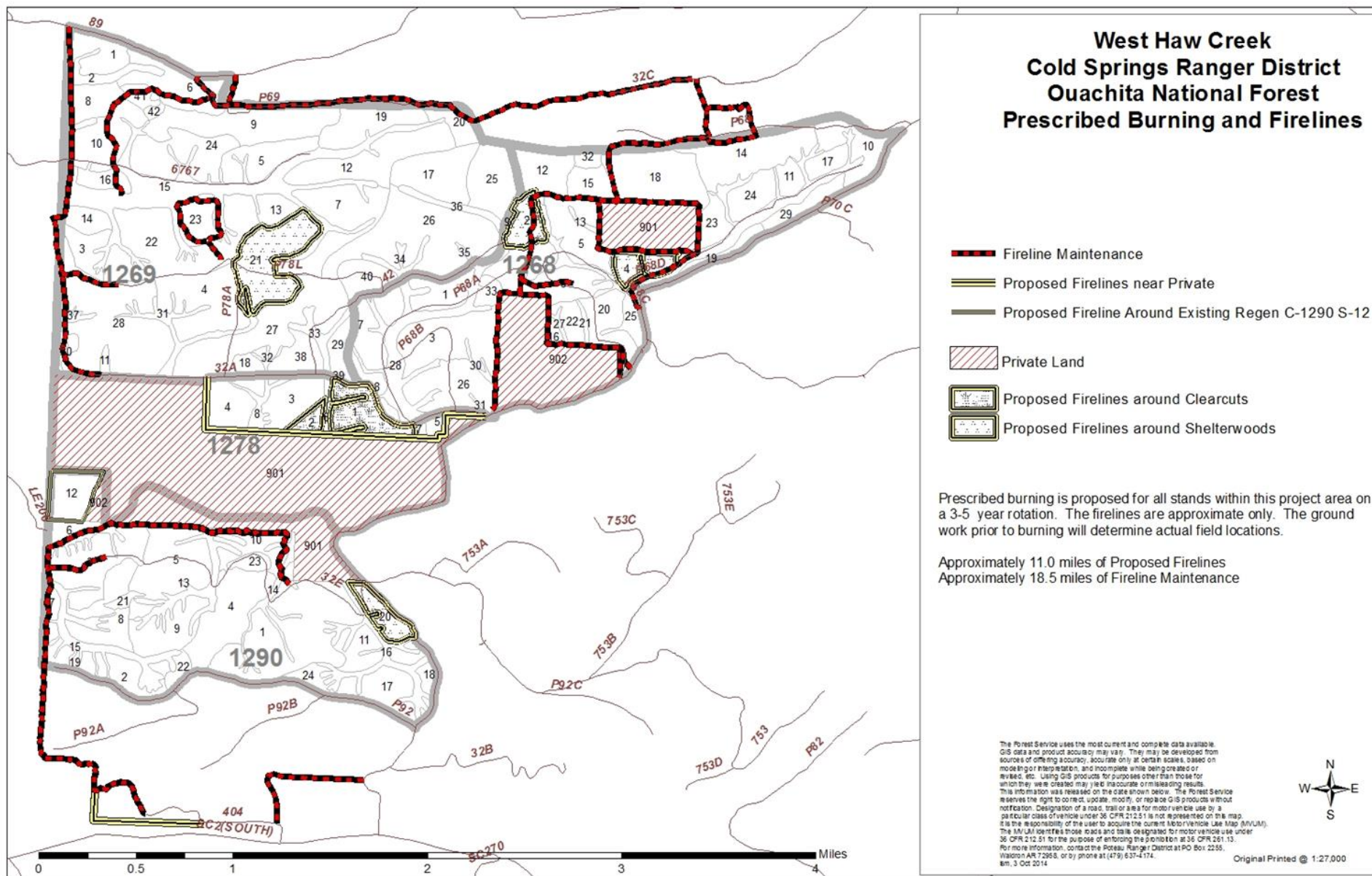


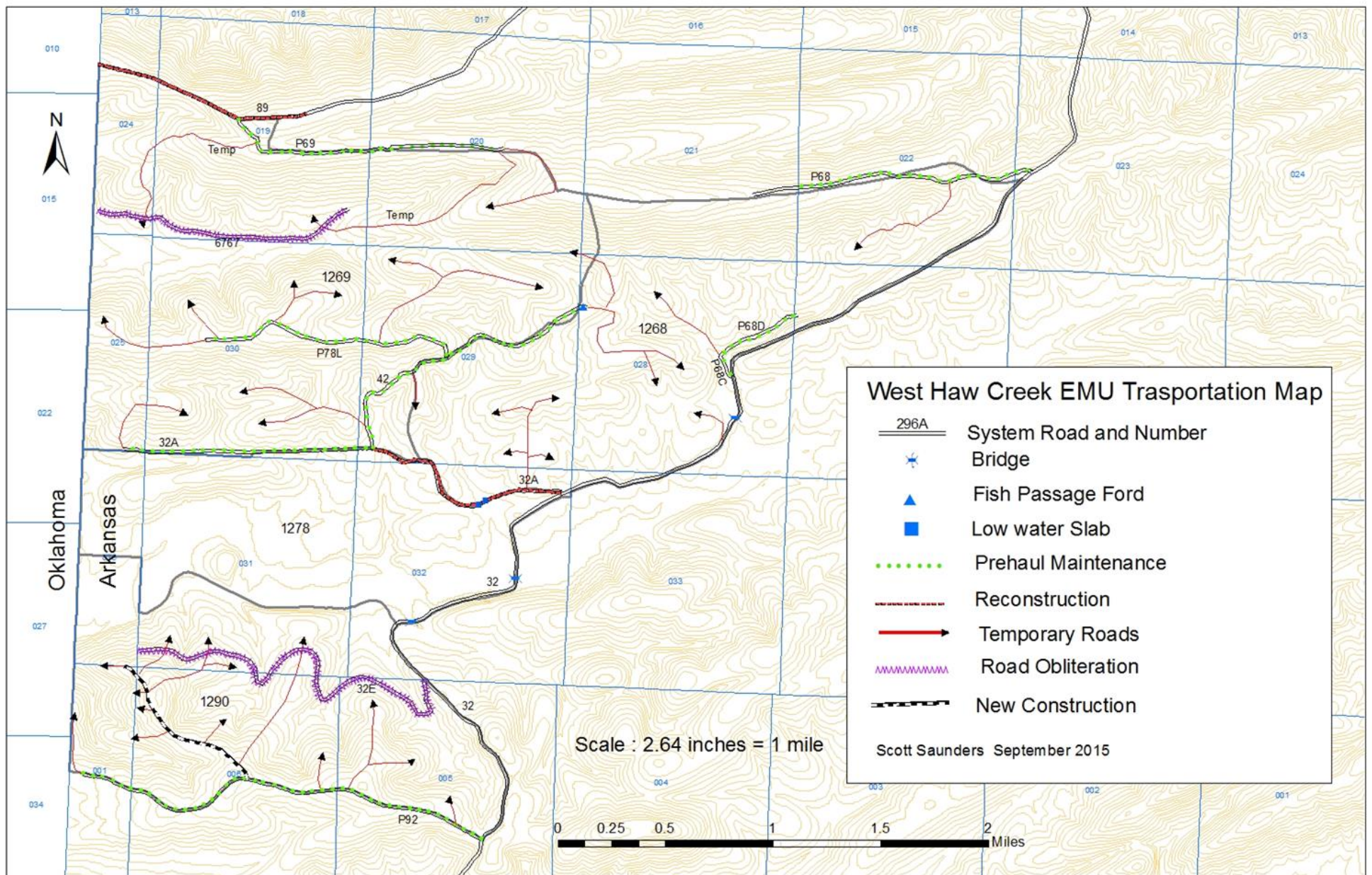
PA MAP OF FINAL
DESIGNATIONS
REGION EPA MAP
FINAL
DESIGNATIONS
REGION 6

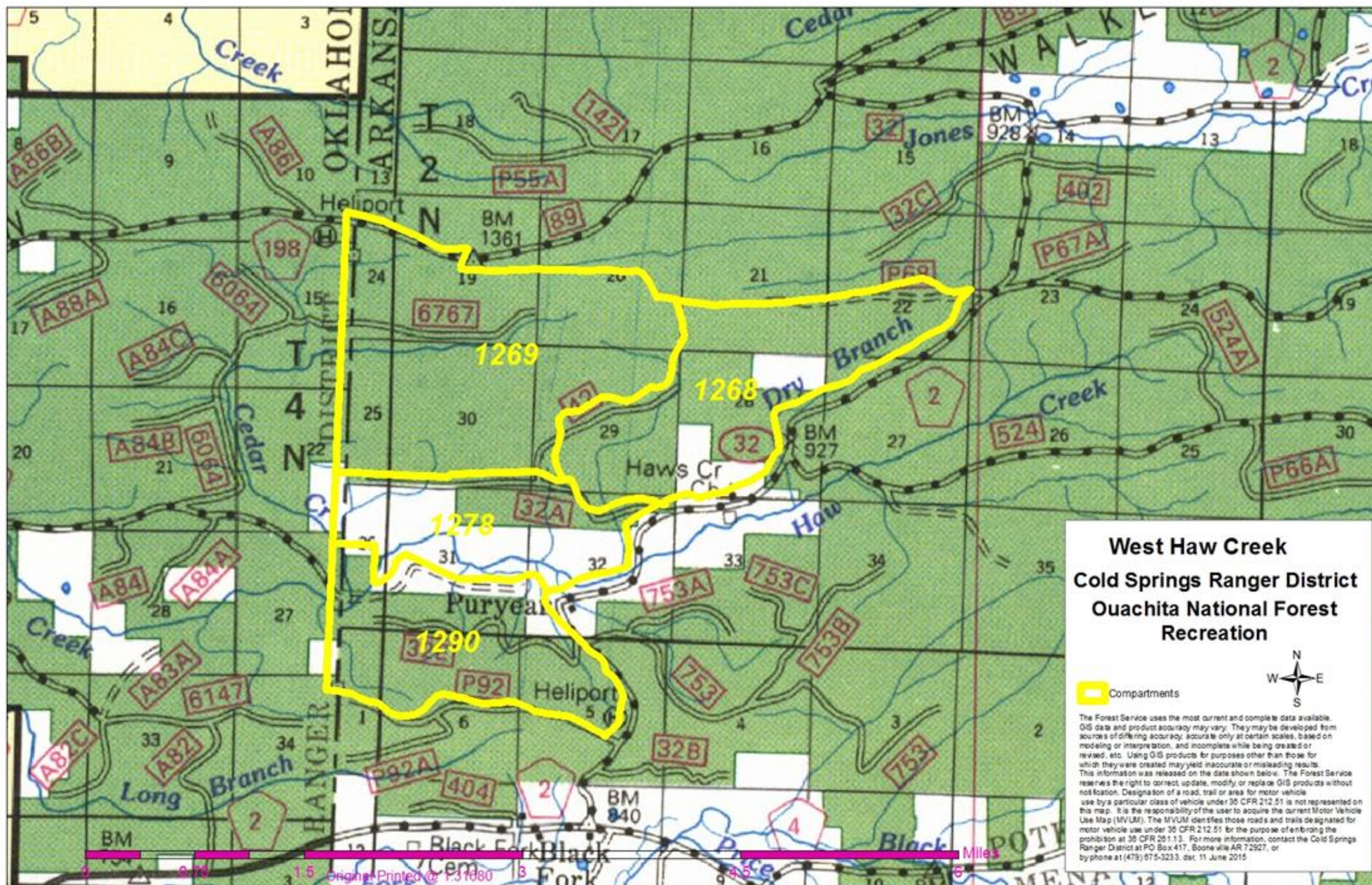
OF











APPENDIX B – DESIRED/EXISTING CONDITIONS, NEEDS

Results of National Forest Management Act (NFMA) analysis describing desired conditions, existing conditions, site specific needs, and possible management activities.

Desired Conditions	Existing Conditions	Site Specific Needs	Possible Management Activities
Restore Pine-grass old growth forests and woodlands (Revised Forest Plan, pp.39).	The project area currently does not completely reflect a Pine-grass old growth forest and woodland.	Maintain and/or improve Management Area 21 conditions to restore the Pine-grass old growth forests and woodlands to the project area.	Low level activities such as prescribed burning and wildlife stand improvements
To have a healthy forest stand (Revised Forest Plan, pp.58-60, 80-83).	Conditions do not exist for successful natural regeneration. There are several stands that are dense and need treatment, mostly in the 10-20 year age class. Competition among species is reducing growth rate affecting tree quality.	Need to create a bed for seed fall after the regeneration harvests. Need to create a suitable seedbed in regeneration sites after initial prescribed burning in even-age regeneration stands. Need to create a suitable seedbed in the even-age regeneration stands after initial prescribed burning and handtools. Need to reduce the stocking rate in stands, where needed. Need to decrease competition for limited nutrients and water among species.	Reforestation Treatments Prescribed Burning Site Prep by Hand tools Site Prep Mechanical Scarification Hand planting of shortleaf pine, Pre-commercial Thin Hand Tool Release Commercial Thinning
Maintain or restore community diversity-and a significant component of species diversity-by utilizing prescribed burning in Management Area 22 (Revised Forest Plan, pp 58). Restore the shortleaf pine-bluestem grass ecosystem within landscapes of 10,000 to 150,000 acres.	Trees in many pine stands are crowded or densely stocked; many Forest stands are older than 70 years of age. These conditions result in stress and reduced vigor and health, increasing susceptibility to insects and disease.	Need to restore healthy conditions by limiting over story, and open the over story to create RCW habitat by removing unhealthy trees, and reducing stocking.	Commercial Thinning Wildlife Stand Improvements
Improve or maintain water resources (Revised Forest Plan pp. 74).	This project area falls within one 6th level watershed – Haw Creek 111101050203 (moderate risk)	Ensure management activities meet Revised Forest Plan standards for water quality and follow Arkansas BMP's	Mitigation
To provide at least one permanent water source per 160 acres for wildlife objectives (Revised Forest Plan, WF010, pp. 79)	There are 33 existing ponds. All ponds need some type of reconstruction. No additional water sources are needed.	Reconstruct 33 existing ponds.	Pond reconstruction
To reduce wildfire hazards. (Revised Forest Plan, pp. 25, OBJ42, OBJ43, pp.68, 69)	Natural fuel buildup and heavy visitor use, increase wildfire hazards in West Haw Creek.	Need to create conditions where a wildfire would not become too hot to kill the overstory and a	Prescribed Burning, commercial thinning, pre-commercial thinning, and WSI treatments.

		threat to adjacent private properties.	
Desired Conditions	Existing Conditions	Site Specific Needs	Possible Management Activities
To have the understory and midstory more open, & dominated by herbaceous vegetation (Revised Forest Plan, WF001, pp. 78)	The understory and midstory currently meet the Forest Plan objectives as a result of past prescribed burning practices.	Need to ensure that the understories and midstories maintain open condition with prescribed fire	Prescribed burning and WSI treatments
To have healthy, productive stands in these areas (Revised Forest Plan, pp.58 -60, 79-83).	Need to manage for the renewal of Shortleaf Pine-Bluestem Grass Ecosystem and RCW habitat (MA 22) and old growth areas (MA 21)	Continue to manage the project area to meet the objectives of Mgt. Area 22 and 21. Need to increase growth rates in these stands and create new age classes.	Harvest Cuts Prescribed Burning WSI Pre-commercial thinning
To have a reliable and abundant hard mast crop. (Revised Forest Plan, OBJ003, pp. 78)	Hardwood crowns are not developed to produce a reliable/abundant hard mast crop from overstocking.	Need to develop hardwood crowns with WSI treatments, so that residual hardwoods will produce a more reliable & abundant mast crop	WSI treatments
To achieve open road density (open road per square mile) objective 0.75 in MA 21 and 1.0 in MA 22, both driven by wildlife concerns (Revised Forest Plan, pp. 59, 67, 90-92)	There are 4,149 acres of NF and 988 acres of private. There are 12.01 miles of open roads. Open road density is 1.50 mi./rd. per sq. mile.	Need to reduce the open road density, where feasible.	None
To provide a safe transportation system that meets the minimum needs of the various resources and their users, minimizes wildlife habitat disturbance, and satisfies some public demand for motorized recreation (Revised Forest Plan, pp. 67).	Current road system is in constant use by hunters, sightseers, Forest Service personnel, and other forest visitors.	Need to access harvest units and provide safe road system. Ensure safe road conditions through periodic maintenance	Road Construction Road Reconstruction Prehaul Maintenance Temporary Roads Decommission Seasonal Closing
There is a need to provide recreation and visual opportunities in the project area. (Revised Forest Plan, pp. 4, 5, 22, 23, 24, 64).	Heavily traveled roads and mostly mature forest conditions are present within RCW habitat. There are no scenic level I or II roads.	Maintain roads to standard and manage to meet habitat requirements. All mgt. activities would meet Scenic Integrity Objectives (SIO) in MA 22/21.	Road maintenance contract and monitor forest management practices.
To provide adequate protection of heritage resource sites. (Revised Forest Plan, pp. 21, 64)	There are 33 known archeological sites; six (6) of the sites will require more investigation to formally determine their eligibility and will need to be protected	Need to use protective measure to ensure that known and found sites are protected.	Identify the other sites on the ground for protection. If any grave sites are discovered, they will be fenced and protected.

APPENDIX C – PROPOSED ACTION

***All **Regeneration** Stands would have reforestation and timber stand improvement activities (Site Preparation, Release, Mechanical Scarification, and TSI. If activities are not successful, rip and plant with shortleaf pine; hand tool release, herbicide, and pre-commercial thinning may be utilized.)

Firelines would be constructed around perimeters of all natural and artificial regeneration areas (i.e. shelterwood or existing regeneration areas). The mechanically constructed fireline would be bladed down to mineral soil and approximately 8 feet wide. Bladed lines would be water barred as necessary on slopes to limit soil movement. Firelines would normally be installed within 50 feet either side of stand boundaries. The purpose of a fireline is for "control" if a prescribed fire is applied to the stands for site preparation and/or to exclude fire during years of stand development. Nest boxes for other species would also be installed where appropriate.

Permits would be offered to the public for collection of rocks by private individuals within road construction and reconstruction corridors. That is, rocks can be collected within areas of disturbance associated with road construction and reconstruction. Firewood and shale pit permits may be issued.

RCW - This proposed action includes other RCW treatments and activities, including use of cavity restrictors, snake and squirrel excluder devices, artificial cavities, single-bird augmentations, multiple-bird group-initiations, brush hogging in cavity tree clusters, removal of southern flying squirrels, population/nest monitoring, cavity maintenance and southern pine beetle (SPB) and Ips control efforts. In active, inactive, and recruitment clusters, retain no more than 10 square feet of basal area per acre in overstory hardwoods. Remove all hardwoods within 50 feet of cavity trees. (Revised Forest Plan pg 122; 22.17) In the event a new RCW cavity tree is found or started within this project area, the immediate area, including drains, that surround the tree (10 acres) would be identified as an active cluster and all activities associated with enhancing and protecting the cluster would begin.

Matrix of Needed Road Work Needed for West Haw Creek Ecological Management Unit

Road Name	Type of Work	Description
32A	Reconstruct	Reconstruct approximately 1.00 mile of this road from 0.00 to 0.50 mile postS. Road will be seasonally open after harvest.
89	Reconstruct	Reconstruct approx. 1.00 mile of this road from Oklahoma state line east for 1 mile. Road will be open after harvest.
		Total Reconstruction – 2.0 miles.
P69	PHM	1.40 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures from road 89 to end. Road would be open after harvest.
P68	PHM	1.10 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures from road 32 to end. Road would be closed after harvest.
P68C	PHM	0.10 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures from road 32 to mile post 0.10. Road would be closed after harvest.
P68D	PHM	0.40 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures from road P68C to mile post 0.40. Road would be closed after harvest.
32A	PHM	1.30 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures from road 42 to end. Road would be open after harvest.
42	PHM	1.45 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures. Road would be Seasonally open after harvest
P78L	PHM	1.30 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures. Road would be closed after harvest
P92	PHM	2.00 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures. Road would be open after harvest
		Total Prehaul Maintenance = 9.05 miles
P90	Construction	1.00 miles of new construction to access proposed harvest areas. (Replaces the 32E road)
		Total Construction = 1.00 miles
32E	Obliteration	1.90 miles to obliterate because it is in a poor location and not needed any more.
6767	Obliteration	1.85 miles to obliterate because it is in a poor location with large washed out pipe and many other rusted out pipe. A new road P90 (1.0 mile) will be built on the ride top in a much better location and will access the same areas.
Various	Obliteration	These roads are not shown on the transportation map but are listed under the Summary and Recommendations section of this report. All of these roads are currently listed as system roads but are in poor locations mostly by drains. These roads can be considered obliterated by nature and taken off the road system. (6.20 miles)
		Total Road Obliteration – 9.95 miles
Temp Roads		14.0 miles – Most are old roads that would be opened; a few would be new. Per Revised Forest Plan design criteria, temporary roads will be decommissioned, revegetated, and recontoured upon termination of management activity.
Various	Decks	Approximately 140 decks to be seeded as temporary wildlife openings.

Compartment 1268 Proposed Actions

STAND	MANAGEMENT	ACRES	BURN	THIN 60 BA pine	THIN 60 BA pine 10 BA hdw	THIN 20' spacing	CLEARCUT	SHELTER WOOD	REFORESTATION and TSI on Proposed Regen	TSI Existing Regen	WSI	PONDS N-new R-recon
1	Thin Pine to 60 BA	32	32	32	0	0	0	0	0	0	32	
2	Shelterwood	25	25	0	0	0	0	25	25	0	0	R-1
3	Thin Pine to 60 BA	81	81	81	0	0	0	0	0	0	81	R-1
4	Shelterwood	24	24	0	0	0	0	24	24	0	0	
5	Thin to 20' spacing	52	52	0	0	52	0	0	0	0	0	
6	Thin Pine to 60 BA	71	71	71	0	0	0	0	0	0	71	R-1
7	Thin to 20' spacing	45	45	0	0	45	0	0	0	0	0	
8	Thin Pine to 60 BA	18	18	18	0	0	0	0	0	0	18	R-1
9	Riparian	2	2	0	0	0	0	0	0	0	0	
10	Thin Pine to 60 BA	47	47	47	0	0	0	0	0	0	47	
11	Thin Pine to 60 BA	14	14	14	0	0	0	0	0	0	14	R-1
12	Rx Fire	44	44	0	0	0	0	0	0	0	0	
13	Riparian	3	3	0	0	0	0	0	0	0	0	
14	Thin Pine to 60 BA/10 BA HWD	81	81	0	81	0	0	0	0	0	81	R-1
15	Rx Fire	23	23	0	0	0	0	0	0	0	0	
16	Thin Pine to 60 BA	7	7	7	0	0	0	0	0	0	7	
17	Thin to 20' spacing	16	16	0	0	16	0	0	0	0	0	
18	Rx Fire	84	84	0	0	0	0	0	0	0	0	R-1
19	Thin Pine to 60 BA	19	19	19	0	0	0	0	0	0	19	
20	Thin Pine to 60 BA	43	43	43	0	0	0	0	0	0	43	R-2
21	Thin Pine to 60 BA	4	4	4	0	0	0	0	0	0	4	
22	Thin Pine to 60 BA	16	16	16	0	0	0	0	0	0	16	
23	Thin Pine to 60 BA	22	22	22	0	0	0	0	0	0	22	
24	Thin Pine to 60 BA	28	28	28	0	0	0	0	0	0	28	
25	Riparian	100	100	0	0	0	0	0	0	0	0	
26	Thin Pine to 60 BA	61	61	61	0	0	0	0	0	0	61	R-2
27	Thin Pine to 60 BA	3	3	3	0	0	0	0	0	0	3	
28	Riparian	76	76	0	0	0	0	0	0	0	0	
29	Thin to 20' spacing	26	26	0	0	26	0	0	0	0	0	
30	Riparian	4	4	0	0	0	0	0	0	0	0	
31	Thin Pine to 60 BA	2	2	2	0	0	0	0	0	0	2	
32	Rx Fire	11	11	0	0	0	0	0	0	0	0	
33	Thin Pine to 60 BA	11	11	11	0	0	0	0	0	0	11	
901	PRIVATE	81	0	0	0	0	0	0	0	0	0	
902	PRIVATE	153	0	0	0	0	0	0	0	0	0	
TOTAL		1329	1095	479	81	139	0	49	49	0	560	R-11

Compartment 1269 Proposed Actions

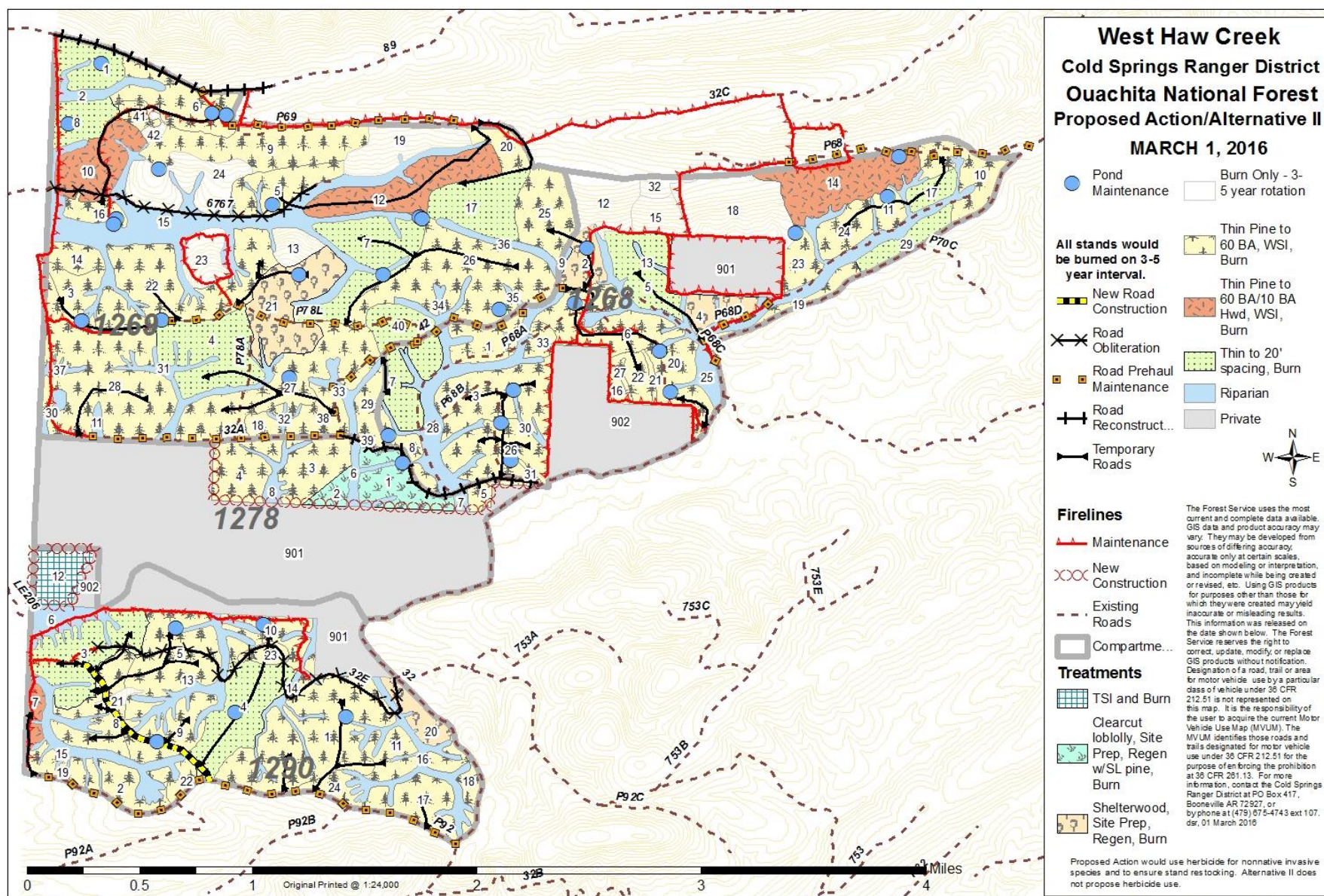
STAND	MANAGEMENT	ACRES	BURN	THIN 60 BA pine	THIN 60 BA pine 10 BA hdw	THIN 20' spacing	CLEARCUT	SHELTER WOOD	REFORESTATION and TSI on Proposed Regen	TSI Existing Regen	WSI	PONDS N-new R-recon
1	Thin to 20' spacing	37	37	0	0	37	0	0	0	0	0	R-1
2	Riparian	17	17	0	0	0	0	0	0	0	0	
3	Thin Pine to 60 BA	24	24	24	0	0	0	0	0	0	24	R-1
4	Thin to 20' spacing	78	78	0	0	78	0	0	0	0	0	
5	Thin Pine to 60 BA	42	42	42	0	0	0	0	0	0	42	
6	Thin Pine to 60 BA	60	60	60	0	0	0	0	0	0	60	R-2
7	Thin to 20' spacing	75	75	0	0	75	0	0	0	0	0	R-1
8	Thin to 20' spacing	30	30	0	0	30	0	0	0	0	0	R-1
9	Thin Pine to 60 BA	95	95	95	0	0	0	0	0	0	95	
10	Thin Pine to 60 BA/10 BA HWD	55	55	0	55	0	0	0	0	0	55	
11	Riparian	4	4	0	0	0	0	0	0	0	0	
12	Thin Pine to 60 BA/10 BA HWD	77	77	0	77	0	0	0	0	0	77	R-2
13	Riparian	18	18	0	0	0	0	0	0	0	0	
14	Thin Pine to 60 BA	18	18	18	0	0	0	0	0	0	18	
15	Riparian	182	182	0	0	0	0	0	0	0	0	
16	Thin Pine to 60 BA	17	17	17	0	0	0	0	0	0	17	R-2
17	Thin to 20' spacing	58	58	0	0	58	0	0	0	0	0	
18	Thin Pine to 60 BA	12	12	12	0	0	0	0	0	0	12	
19	Rx Fire	48	48	0	0	0	0	0	0	0	0	
20	Thin Pine to 60 BA	23	23	23	0	0	0	0	0	0	23	
21	Shelterwood	80	80	0	0	0	0	80	80	0	0	R-2
22	Thin Pine to 60 BA	122	122	122	0	0	0	0	0	0	122	R-1
23	Rx Fire	28	28	0	0	0	0	0	0	0	0	
24	Rx Fire	64	64	0	0	0	0	0	0	0	0	R-1
25	Thin Pine to 60 BA	55	55	55	0	0	0	0	0	0	55	
26	Thin Pine to 60 BA	143	143	143	0	0	0	0	0	0	143	R-1
27	Thin Pine to 60 BA	108	108	108	0	0	0	0	0	0	108	R-1
28	Thin Pine to 60 BA	166	166	166	0	0	0	0	0	0	166	
29	Thin Pine to 60 BA	27	27	27	0	0	0	0	0	0	27	
30-37	Riparian	86	86	0	0	0	0	0	0	0	0	
38	Thin Pine to 60 BA	28	28	28	0	0	0	0	0	0	28	
39	Riparian	1	1	0	0	0	0	0	0	0	0	
40	Thin to 20' spacing	29	29	0	0	29	0	0	0	0	0	
41	Thin Pine to 60 BA	11	11	11	0	0	0	0	0	0	11	
42	Rx Fire	5	5	0	0	0	0	0	0	0	0	
		1924	1924	951	132	307	0	80	80	0	1083	R-16

Compartment 1278 Proposed Actions

STAND	MANAGEMENT	ACRES	BURN	THIN 60 BA pine	THIN 60 BA pine 10 BA hdw	THIN 20' spacing	CLEARCUT	SHELTER WOOD	REFORESTATION and TSI on Proposed Regen	TSI Existing Regen	WSI	PONDS N-new R-recon
1	CC LOB RGEN SLP	45	45	0	0	0	45	0	0	0	0	R-1
2	CC LOB RGEN SLP	12	12	0	0	0	12	0	0	0	0	
3	Thin Pine to 60 BA	44	44	44	0	0	0	0	0	0	44	
4	Thin Pine to 60 BA	46	46	46	0	0	0	0	0	0	46	
5	Thin Pine to 60 BA	11	11	11	0	0	0	0	0	0	11	
6-8	Riparian	30	30	0	0	0	0	0	0	0	0	
901	Private	634	0	0	0	0	0	0	0	0	0	
TOTAL		822	188	101	0	0	57	0	0	0	101	R-1

Compartment 1290 Proposed Actions

STAND	MANAGEMENT	ACRES	BURN	THIN 60 BA pine	THIN 60 BA pine 10 BA hdw	THIN 20' spacing	CLEARCUT	SHELTER WOOD	REFORESTATION and TSI on Proposed Regen	TSI Existing Regen	WSI	PONDS N-new R-recon
1	Thin Pine to 60 BA	151	151	151	0	0	0	0	0	0	151	R-1
2	Thin Pine to 60 BA	28	28	28	0	0	0	0	0	0	28	
3	Thin to 20' spacing	75	75	0	0	75	0	0	0	0	0	
4	Thin to 20' spacing	74	74	0	0	74	0	0	0	0	0	R-1
5	Thin Pine to 60 BA	82	82	82	0	0	0	0	0	0	82	R-1
6	Riparian	27	27	0	0	0	0	0	0	0	0	
7	Thin Pine to 60 BA/10 BA HWD	12	12	0	12	0	0	0	0	0	12	
8	Thin Pine to 60 BA	50	50	50	0	0	0	0	0	0	50	
9	Thin Pine to 60 BA	43	43	43	0	0	0	0	0	0	43	R-1
10	Thin Pine to 60 BA	33	33	33	0	0	0	0	0	0	33	R-1
11	Thin Pine to 60 BA	25	25	25	0	0	0	0	0	0	25	
12	Rx Fire	37	37	0	0	0	0	0	0	37	0	
13-16	Riparian	151	151	0	0	0	0	0	0	0	0	
17	Thin Pine to 60 BA	43	43	43	0	0	0	0	0	0	43	
18	Thin Pine to 60 BA	22	22	22	0	0	0	0	0	0	22	
19	Thin Pine to 60 BA	24	24	24	0	0	0	0	0	0	24	
20	Shelterwood	25	25	0	0	0	0	25		0	0	
21	Rx Fire	5	5	0	0	0	0	0		0	0	
22	Thin Pine to 60 BA	10	10	10	0	0	0	0		0	10	
23	Thin Pine to 60 BA	10	10	10	0	0	0	0		0	10	
24	Thin Pine to 60 BA	15	15	15	0	0	0	0		0	15	
901/902	Private	121	0	0	0	0	0	0	0	0	0	
TOTAL		1063	942	536	12	149	0	25	0	37	548	R-5



APPENDIX D – NO ROAD CONSTRUCTION

ALTERNATIVE III

***All **Regeneration** Stands would have reforestation and timber stand improvement activities (Site Preparation, Release, Mechanical Scarification, and TSI. If activities are not successful, rip and plant with shortleaf pine; hand tool release, herbicide, and pre-commercial thinning may be utilized.)

Firelines would be constructed around perimeters of all natural and artificial regeneration areas (i.e. shelterwood or existing regeneration areas). The mechanically constructed fireline would be bladed down to mineral soil and approximately 8 feet wide. Bladed lines would be water barred as necessary on slopes to limit soil movement. Firelines would normally be installed within 50 feet either side of stand boundaries. The purpose of a fireline is for “control” if a prescribed fire is applied to the stands for site preparation and/or to exclude fire during years of stand development. Nest boxes for other species would also be installed where appropriate.

Permits would be offered to the public for collection of rocks by private individuals within road construction and reconstruction corridors. That is, rocks can be collected within areas of disturbance associated with road construction and reconstruction. Firewood and shale pit permits may be issued.

RCW - This proposed action includes other RCW treatments and activities, including use of cavity restrictors, snake and squirrel excluder devices, artificial cavities, single-bird augmentations, multiple-bird group-initiations, brush hogging in cavity tree clusters, removal of southern flying squirrels, population/nest monitoring, cavity maintenance and southern pine beetle (SPB) and Ips control efforts. In active, inactive, and recruitment clusters, retain no more than 10 square feet of basal area per acre in overstory hardwoods. Remove all hardwoods within 50 feet of cavity trees. (Revised Forest Plan pg 122; 22.17) In the event a new RCW cavity tree is found or started within this project area, the immediate area, including drains, that surround the tree (10 acres) would be identified as an active cluster and all activities associated with enhancing and protecting the cluster would begin.

Matrix of Needed Road Work Needed for West Haw Creek Ecological Management Unit – Alternative III

Road Name	Work Type	Description
32A	Reconstruct	Reconstruct approximately 1.00 mile of this road from 0.00 to 0.50 mile posts. Open seasonally after harvest.
89	Reconstruct	Reconstruct approx. 1.00 mile of this road from Oklahoma state line east for 1 mile. Road will be open after harvest.
Total Reconstruction – 2.0 miles.		
P69	PHM	1.40 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures from road 89 to end. Road would be open after harvest.
P68	PHM	1.10 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures from road 32 to end. Road would be closed after harvest.
P68C	PHM	0.10 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures from road 32 to mile post 0.10. Road would be closed after harvest.
P68D	PHM	0.36 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures from road P68C to mile post 0.40. Road would be closed after harvest.
32A	PHM	0.69 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures from road 42 to end. Road would be open after harvest.
42	PHM	1.45 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures. Road would be Seasonally open after harvest
P78L	PHM	0.49 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures. Road would be closed after harvest
P92	PHM	2.00 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures. Road would be open after harvest
Total Prehaul Maintenance = 7.59 miles		
Total Construction = 0.00 miles		
32E	Obliteration	1.90 miles to obliterate because it is in a poor location and not needed any more.
6767	Obliteration	1.85 miles to obliterate because it is in a poor location with large washed out pipe and many other rusted out pipe. A new road P90 (1.0 mile) will be built on the ride top in a much better location and will access the same areas.
Various	Obliteration	These roads are not shown on the transportation map but are listed under the Summary and Recommendations section of this report. All of these roads are currently listed as system roads but are in poor locations mostly by drains. These roads can be considered obliterated by nature and taken off the road system. (6.20 miles)
Total Road Obliteration – 9.95 miles		
Temp Roads		0.0 miles
Various	Decks	Approximately 47 decks to be seeded as temporary wildlife openings.

Compartment 1268 Alternative III

STAND	MANAGEMENT	ACRES	BURN	THIN 60 BA pine	THIN 60 BA pine 10 BA hdw	THIN 20' spacing	CLEARCUT	SHELTER WOOD	REFORESTATION and TSI on Proposed Regen	TSI Existing Regen	WSI	PONDS N-new R-recon
1	Thin Pine to 60 BA	32	32	32	0	0	0	0	0	0	32	
2	Shelterwood	25	25	0	0	0	0	25	25	0	0	R-1
3	Rx Fire	81	81	0	0	0	0	0	0	0	0	R-1
4	Shelterwood	24	24	0	0	0	0	24	24	0	0	
5	Rx Fire	52	52	0	0	0	0	0	0	0	0	
6	Thin Pine to 60 BA	71	71	0	0	0	0	0	0	0	0	R-1
7	Thin to 20' spacing	45	45	0	0	45	0	0	0	0	0	
8	Thin Pine to 60 BA	18	18	18	0	0	0	0	0	0	18	R-1
9	Riparian	2	2	0	0	0	0	0	0	0	0	
10	Thin Pine to 60 BA	47	47	47	0	0	0	0	0	0	47	
11	Rx Fire	14	14	0	0	0	0	0	0	0	0	R-1
12	Rx Fire	44	44	0	0	0	0	0	0	0	0	
13	Riparian	3	3	0	0	0	0	0	0	0	0	
14	Thin Pine 60 BA/10 BA HWD	81	81	0	81	0	0	0	0	0	81	R-1
15	Rx Fire	23	23	0	0	0	0	0	0	0	0	
16	Rx Fire	7	7	0	0	0	0	0	0	0	0	
17	Rx Fire	16	16	0	0	0	0	0	0	0	0	
18	Rx Fire	84	84	0	0	0	0	0	0	0	0	R-1
19	Thin Pine to 60 BA	19	19	19	0	0	0	0	0	0	19	
20	Rx Fire	43	43	0	0	0	0	0	0	0	0	R-2
21	Rx Fire	4	4	0	0	0	0	0	0	0	0	
22	Rx Fire	16	16	0	0	0	0	0	0	0	0	
23	Rx Fire	22	22	0	0	0	0	0	0	0	0	
24	Rx Fire	28	28	0	0	0	0	0	0	0	0	
25	Riparian	100	100	0	0	0	0	0	0	0	0	
26	Rx Fire	61	61	0	0	0	0	0	0	0	0	R-2
27	Rx Fire	3	3	0	0	0	0	0	0	0	0	
28	Riparian	76	76	0	0	0	0	0	0	0	0	
29	Thin to 20' spacing	26	26	0	0	26	0	0	0	0	0	
30	Riparian	4	4	0	0	0	0	0	0	0	0	
31	Rx Fire	2	2	0	0	0	0	0	0	0	0	
32	Rx Fire	11	11	0	0	0	0	0	0	0	0	
33	Thin Pine to 60 BA	11	11	0	0	0	0	0	0	0	0	
901	PRIVATE	81	0	0	0	0	0	0	0	0	0	
902	PRIVATE	153	0	0	0	0	0	0	0	0	0	
TOTAL		1329	1095	116	81	71	0	49	49	0	197	R-11

Compartment 1269 Alternative III

STAND	MANAGEMENT	ACRES	BURN	THIN 60 BA pine	THIN 60 BA pine 10 BA hdw	THIN 20' spacing	CLEARCUT	SHELTER WOOD	REFORESTATION and TSI on Proposed Regen	TSI Existing Regen	WSI	PONDS N-new R-recon
1	Thin to 20' spacing	37	37	0	0	37	0	0	0	0	0	R-1
2	Riparian	17	17	0	0	0	0	0	0	0	0	
3	Rx Fire	24	24	0	0	0	0	0	0	0	0	R-1
4	Rx Fire	78	78	0	0	0	0	0	0	0	0	
5	Rx Fire	42	42	0	0	0	0	0	0	0	0	R-1
6	Thin Pine to 60 BA	60	60	60	0	0	0	0	0	0	60	R-2
7	Rx Fire	75	75	0	0	0	0	0	0	0	0	
8	Rx Fire	30	30	0	0	0	0	0	0	0	0	R-1
9	Thin Pine to 60 BA	95	95	95	0	0	0	0	0	0	95	
10	Rx Fire	55	55	0	0	0	0	0	0	0	0	
11	Riparian	4	4	0	0	0	0	0	0	0	0	
12	Rx Fire	77	77	0	0	0	0	0	0	0	0	
13	Riparian	18	18	0	0	0	0	0	0	0	0	
14	Rx Fire	18	18	0	0	0	0	0	0	0	0	
15	Riparian	182	182	0	0	0	0	0	0	0	0	
16	Rx Fire	17	17	0	0	0	0	0	0	0	0	R-2
17	Rx Fire	58	58	0	0	0	0	0	0	0	0	
18	Thin Pine to 60 BA	12	12	12	0	0	0	0	0	0	12	
19	Rx Fire	48	48	0	0	0	0	0	0	0	0	
20	Thin Pine to 60 BA	23	23	23	0	0	0	0	0	0	23	
21	Rx Fire	80	80	0	0	0	0	0	0	0	0	
22	Rx Fire	122	122	0	0	0	0	0	0	0	0	R-1
23	Rx Fire	28	28	0	0	0	0	0	0	0	0	
24	Rx Fire	64	64	0	0	0	0	0	0	0	0	R-1
25	Rx Fire	55	55	0	0	0	0	0	0	0	0	
26	Rx Fire	143	143	0	0	0	0	0	0	0	0	R-1
27	Thin Pine to 60 BA	108	108	108	0	0	0	0	0	0	108	R-1
28	Rx Fire	166	166	0	0	0	0	0	0	0	0	
29	Rx Fire	27	27	0	0	0	0	0	0	0	0	
30-37	Riparian	86	86	0	0	0	0	0	0	0	0	
38	Rx Fire	28	28	0	0	0	0	0	0	0	0	
39	Riparian	1	1	0	0	0	0	0	0	0	0	
40	Thin to 20' spacing	29	29	0	0	29	0	0	0	0	0	
41	Rx Fire	11	11	0	0	0	0	0	0	0	0	
42	Rx Fire	5	5	0	0	0	0	0	0	0	0	
TOTAL		1924	1924	298	0	66	0	0	0	0	298	R-12

Compartment 1278 Alternative III

STAND	MANAGEMENT	ACRES	BURN	THIN 60 BA pine	THIN 60 BA pine 10 BA hdw	THIN 20' spacing	CLEARCUT	SHELTER WOOD	REFORESTATION and TSI on Proposed Regen	TSI Existing Regen	WSI	PONDS N-new R-recon
1	CC LOB RGEN SLP	45	45	0	0	0	45	0	0	0	0	R-1
2	CC LOB RGEN SLP	12	12	0	0	0	12	0	0	0	0	
3	Thin Pine to 60 BA	44	44	44	0	0	0	0	0	0	44	
4	Thin Pine to 60 BA	46	46	46	0	0	0	0	0	0	46	
5	Thin Pine to 60 BA	11	11	11	0	0	0	0	0	0	11	
6-8	Riparian	30	30	0	0	0	0	0	0	0	0	
901	Private	634	0	0	0	0	0	0	0	0	0	
TOTAL		822	188	101	0	0	57	0	0	0	101	R-1

Compartment 1290 Alternative III

STAND	MANAGEMENT	ACRES	BURN	THIN 60 BA pine	THIN 60 BA pine 10 BA hdw	THIN 20' spacing	CLEARCUT	SHELTER WOOD	REFORESTATION and TSI on Proposed Regen	TSI Existing Regen	WSI	PONDS N-new R-recon
1	Rx Fire	151	151	0	0	0	0	0	0	0	0	
2	Rx Fire	28	28	28	0	0	0	0	0	0	28	
3	Rx Fire	75	75	0	0	0	0	0	0	0	0	
4	Rx Fire	74	74	0	0	0	0	0	0	0	0	
5	Rx Fire	82	82	0	0	0	0	0	0	0	0	R-1
6	Riparian	27	27	0	0	0	0	0	0	0	0	
7	Rx Fire	12	12	0	0	0	0	0	0	0	0	
8	Rx Fire	50	50	0	0	0	0	0	0	0	0	
9	Rx Fire	43	43	0	0	0	0	0	0	0	0	
10	Rx Fire	33	33	0	0	0	0	0	0	0	0	R-1
11	Rx Fire	25	25	0	0	0	0	0	0	0	0	
12	TSI/Rx Fire	37	37	0	0	0	0	0	0	37	0	
13-16	Riparian	151	151	0	0	0	0	0	0	0	0	
17	Thin Pine to 60 BA	43	43	43	0	0	0	0	0	0	43	
18	Thin Pine to 60 BA	22	22	22	0	0	0	0	0	0	22	
19	Thin Pine to 60 BA	24	24	24	0	0	0	0	0	0	24	
20	Shelterwood	25	25	0	0	0	0	25	0	0	0	
21	Rx Fire	5	5	0	0	0	0	0	0	0	0	
22	Thin Pine to 60 BA	10	10	10	0	0	0	0	0	0	10	
23	Rx Fire	10	10	0	0	0	0	0	0	0	0	
24	Thin Pine to 60 BA	15	15	15	0	0	0	0	0	0	15	
901/902	Private	121	0	0	0	0	0	0	0	0	0	
TOTAL		1063	942	142	0	0	0	25	0	37	142	R-2

